

# POPULAR MEDICINE;

OR,

## FAMILY ADVISER;

CONSISTING OF

### OUTLINES

OF

ANATOMY, PHYSIOLOGY, AND HYGIENE,

WITH SUCH HINTS ON THE

**PRACTICE OF PHYSIC, SURGERY,**

AND THE

DISEASES OF WOMEN AND CHILDREN,

AS MAY PROVE USEFUL IN FAMILIES WHEN REGULAR  
PHYSICIANS CANNOT BE PROCURED :

BEING A COMPANION AND GUIDE FOR INTELLIGENT PRINCIPALS OF MANUFACTORIES, PLANTATIONS, AND BOARDING-SCHOOLS, HEADS OF FAMILIES, MASTERS OF VESSELS, MISSIONARIES, OR TRAVELLERS; AND A USEFUL SKETCH FOR YOUNG MEN ABOUT COMMENCING THE STUDY OF MEDICINE.

BY

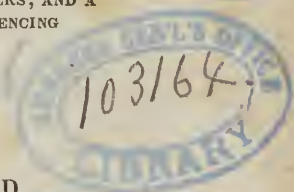
REYNELL COATES, M. D.

Fellow of the College of Physicians of Philadelphia—Honorary Member of the Philadelphia Medical Society—Correspondent of the Lyceum of Natural History of New York—Member of the Academy of Natural Sciences of Philadelphia—Formerly Resident Surgeon of the Pennsylvania Hospital, &c.—Assisted by several Medical Friends.

PHILADELPHIA:

CAREY, LEA & BLANCHARD.

1838.







## P R E F A C E.

---

THE medical profession has opposed, at all times, the publication of works on domestic medicine, and it has been the custom of the public, to attribute their opposition to a selfish motive.

The projector of the present treatise, however, does full justice to the character of his professional brethren, well knowing the immense sacrifices of time, money, and comfort, which they cheerfully encounter in their unceasing and ill-requited exertions to promote the cause of humanity. Admitting then, on the one hand, that it is impossible to communicate mere practical directions for the treatment of disease to those who are ignorant of the science of physiology, without employing extreme caution or producing incalculable mischief, he repels with scorn, on behalf of that profession the best interests of which have been the study of his life, all charges of sinister or meanly mercenary motives, when cast upon a great body of benevolent men who are ever willing to undergo the maximum of labour for the minimum of reward.

But it appears to the author, that the principal evils which have resulted, and are likely to result hereafter, from attempts at popular medical instruction, are attributable rather to the manner in which the subject has been treated, than to the nature of the subject itself. Without wishing to detract from the merit of several works already before the public, he believes that all his predecessors have passed too slightly over many matters which may be rendered quite intelligible to

persons unacquainted with the science of medicine; while they have attempted to lay down directions for the treatment of many states or conditions of disease, which can only be distinguished with certainty, or managed with success, by those who have obtained the moral right to employ the most potent, but most dangerous weapons by the acquisition of extensive learning, aided by long continued observation and experience. In venturing upon this publication, the endeavour has been made to avoid the errors just mentioned;—with what success, the public must determine.

It forms no part of the author's intention, to induce an under estimate of the necessity of medical advice, when such advice can be obtained; but, at the same time, he is not so warmly attached to what may be considered *right in the abstract* as to cast aside all considerations of *expediency*. We must deal with society as we find it,—not as the best friends of humanity would have it; and it is a well known fact, that, even among those who are enabled, both by wealth and location, to command the services of the best practitioners, a very considerable number prescribe, and will continue to prescribe for themselves and their families, when labouring under complaints which *they* consider simple and easily cured.

Persons of another more numerous class endeavour to elude the payment of fees, by adopting the gratuitous, or indirectly requited advice of the apothecary; thus preferring "*half a loaf to no bread.*"

The gentlemen of the pharmaceutical profession, whose situation differs widely from that of their brethren in England, will doubtless feel grateful for any effort to relieve them from a serious responsibility, which is at once annoying and unprofitable, while it appears censurable in the eyes of those who know the serious evils growing out of its assumption. For the regularly educated portion of the medical profession, we will pledge ourselves, unhesitatingly, that they would gladly relinquish a share of those considerable emoluments which they now derive from the mis-

management and complication of cases originally simple, through the folly of empirics, in consideration of the serious amount of human suffering which would be saved if the domain of *quackery* were limited, by the general diffusion of some physiological knowledge.

While, then, a large and respectable portion of the community are resolved to resort to domestic, or to semi-professional skill, in the management of their health, it is assuredly desirable that they should acquire some knowledge of the machine upon which they operate, and the forces that they employ.

But there are other far more important arguments in favour of extending some medical information to the public in general. Even in our large cities,—the centres of science,—a portion of the population is too poor to remunerate a physician, and too proud to appeal to his charity, unless under the most pressing emergency. To such, the services of a kind neighbour, or pastor, or an intelligent relative, might prove invaluable, if directed by some knowledge of disease: he might relieve unpleasant symptoms when not of great importance, and he would be prepared to warn the unwary of the approach of dangers demanding the sacrifice of all scruples.

In the West,—where the tide of immigration sweeps on so rapidly, that new communities are created every year, and in such numbers that heaven and earth are ransacked to find appellatives for the growing host of towns and villages,—a very considerable portion of the population is placed entirely beyond the aid of the profession; and much larger masses reside at so great a distance from the physician, that the most important period in the progress of all acute diseases necessarily elapses, before his arrival.

At the south, still greater difficulties exist. On the large estates of the planters, a family composed of thirty, fifty, or even a hundred or more individuals, often remains cut off in a great degree from the rest of the world, and dependent almost exclusively upon the agriculturist for hygienic, medical, and even surgi-

cal treatment. It has been truly said that, a little knowledge is a dangerous thing; but certainly, in the situation just described, the remainder of the couplet is inapplicable.

Another incalculable advantage which results from the extension of correct medical knowledge beyond the limits of the profession, is the difficulty which it throws in the way of the ignorant pretender, by enabling the public to judge more correctly of medical information. For, although the writer contemns the arrogance of those who have ventured, in similar works, to persuade their readers that all opinions differing from their own are the offspring of ignorance or folly, yet he believes that the principles laid down, and the practical directions given, in the following pages, will be found generally in accordance with received doctrines. They will therefore enable the patient, or his friends, so to direct their questions to the practitioner, and to comprehend the replies, as to distinguish between the mere empiric, and the man who has really studied his profession; an advantage of immense value to both parties, in situations distant from large cities.

Among the strongest proofs of the propriety of the present undertaking, are the constant demand for a popular medical guide of some kind, and the circumstance that the very few works of this character now extant, which can be considered as adapted to the present state of the science, have their subject matter arranged in alphabetical order:—an arrangement which precludes the possibility of preserving the recollection of the mutual relations of facts, and destroys that system which is best calculated to aid the memory, facilitate reference, and impress correct principles.

In executing his task, the author has endeavoured conscientiously to inculcate such caution as is calculated to secure his readers against a rash dependence upon their own partially enlightened endeavours, when other and more efficient assistance is at hand, while he has exerted himself to communicate, in a form as much condensed as possible, whatever infor-



mation he considers likely to aid the cause of humanity under less favourable circumstances.

The foregoing explanations are due to the practitioners of an honourable profession. To those who propose to commence the study of that profession, it may be stated that, under the present organization of our universities and medical colleges, the pupil, at the moment of entering upon his career, is overwhelmed by the quantity of scientific matter forced upon his attention by the number and variety of the lectures he is called upon to attend. These lectures treat of a variety of sciences, the very terminology of which is unknown to him; and much of the value of his first year of study is usually lost in obtaining a few general ideas, laboriously gleaned from a great mass of more profound, but, to him, unintelligible learning. Some weeks spent in perusing and reflecting upon the contents of the first three chapters of the present work, will communicate, it is confidently believed, such broad views and impressions on anatomical, physiological, and hygienic subjects, as will enable him to listen with pleasure and advantage to the first course of medical instruction;—that tedious, and, to many, almost intolerable portion of the labour of a student.

It is now time to address the public in general, on the design of the present work. The best advice that can be given to an individual actually suffering under disease, or desirous of pursuing such a course of diet, exercise, &c., as is likely to promote his health, and invigorate and preserve the force of his constitution, is, most unquestionably, to recommend a consultation with some deservedly eminent physician. But the directions and reasonings of a physician are better understood by a patient who has himself some knowledge of the first principles of medicine. This knowledge is also a protection against the machinations of wonder-working empirics; for who, that has the slightest idea of the structure of the most complicated of all the works of nature, would confide the management of such a delicate machine to the hands of an ignorant pretender.

It is not always possible to obtain the desired assistance in due time, and in many situations it is altogether impracticable to obtain it at all. There are few medical men who have reached middle age without witnessing much misery and some loss of life, resulting from the ill-directed efforts of those who are compelled to act on an emergency, before the arrival of a physician. The writer of this treatise could adduce, from personal observation, a list of startling instances of that nature; all of which might have been prevented by the presence of any one possessed of a small share of the information which he trusts may be derived from the following pages. There is, therefore, no intelligent man who may not find his own comfort consulted, and his sphere of usefulness increased, by studying the first principles of physiology, hygiene, practical medicine, and surgery.

To heads of families, principals of large manufactories, seminaries, and landed estates, missionaries on foreign stations, and the captains of vessels, such knowledge is still more important.

"The Medical Friend," being designed not to supersede the family physician, but merely to supply his place, when inaccessible, it will be found that the practical part of the work dwells chiefly on diseases of an acute character, and that when chronic complaints are mentioned, directions for the management of the earlier stages have received more attention than the after treatment. Those diseases which are incurable in their nature, or which defy domestic treatment at any stage, are omitted, or but lightly touched upon; and when such remedies or operations as are employed only by the profession become the subject of remark, they are introduced merely to gratify the natural curiosity of the reader. When, in the current of a case, the requisite treatment becomes dangerous, or demands superior skill, the subject is generally fore-closed by referring the reader to competent medical advisers.

The work is divided into two parts; of which the first is descriptive and theoretical, the second practi-

cal. It is desirable that all who would qualify themselves for rightly comprehending the practical part should peruse, previously and attentively, the first four chapters, which may be regarded as introductory.

Technicalities have been avoided throughout the treatise, and it has been the constant endeavour of the writer to shun whatever pre-supposes an acquaintance with medicine or its collateral branches. The vast range of the subject renders impossible any considerable attention to detail in the first part, and it is hoped that the style will be found as light and entertaining as comports with the gravity and importance of the matter.

After a short preliminary chapter, containing a very cursory view of certain broad principles in comparative anatomy, the second chapter presents a more particular notice of human general anatomy, with but little that appertains to the department of special anatomy; but, to enliven a subject usually considered peculiarly dry, a few physiological remarks are occasionally interspersed.

The third chapter contains a view of the principal animal functions, and some comments on their aberrations from healthy action. The artificial division between physiology and pathology, very properly adopted in the schools, has been here neglected, as calculated to confuse the general reader. Although it would be absurd to attempt to teach the details of the science of physiology within thrice the compass of the volume now offered to the public, and although years of application, with all the advantages of a thorough elementary education, would be necessary to complete the study, there are nevertheless certain general principles herein contained, which may be easily acquired, and which render the information presented in the succeeding chapters much more available. The subject is highly interesting in its nature, and it is hoped that the reader will find, in the entertainment which it furnishes, an ample remuneration for the labour of a careful perusal.

The fourth chapter, on hygiene, or the art of preserving health, is by no means the least important portion of the work, and is worthy the attention of every head of a family, or principal of a school. The several subjects of food, clothing, air and moisture, exercise, the errors of female school discipline, and matrimony, are discussed under distinct heads. Many valuable rules for gradually imparting strength to the constitution, and for the preservation of health under atmospheric vicissitudes, or in unhealthy situations, will be found in this chapter.

The second, or practical portion of the work is divided into five chapters, on the following several subjects : surgical accidents and diseases, medical practice, diseases of married women, diseases of children, and diseases of adult females. It has been already remarked, that the alphabetical arrangement of subjects has not been adopted in any part of this work ; but all the conveniences derived from such a distribution, may be obtained by reference to the very copious index provided for each of the two great divisions of this volume.

An appendix contains a list of many of the simple medicines and compound prescriptions recommended in the work, with the mode of preparing the latter. It is remarked, that the most experienced practitioners generally employ the smallest number of remedies, as the most able mechanic often uses but few implements. Instead, then, of following the example of his predecessors, by perplexing the minds of his readers with a history of a great multitude of medicines, the writer has confined his attention to those of established reputation, and named in the body of the work.

Having thus narrated the contents of the volume, it is proper to mention what portions of the labour have been performed by the avowed author, and what part has been executed by the professional friends, who have aided him in departments to which they have devoted more especial attention, though they have declined the announcement of their names.



The author is directly responsible for the whole of the first part of the work, and for all that is strictly surgical in the second part, with the exception of the articles hemorrhoids, hip-joint disease, and white swelling, and the surgical section on constitutional diseases.

The science of medicine in modern times has taken a range so vast in extent, and complex in detail, that it would be presumptuous in any one individual, whatever may be his position, to undertake the production of a work glancing over nearly the whole field of the theory and practice of medicine, without the aid of those whose observations have been more extensive than his own in such departments as he has neglected by necessity, or avoided by preference. The more cursory, and general the treatise, the more profound is the knowledge required to give value to the pages, and to avoid the danger of serious error: for, when numerous facts are systematically expressed and arranged, it is much easier to include them within definite rules, than when these facts rest only in the memory of one who writes the results of past study, reflection, and experience, as the author of this work has written—*currente calamo*. For these reasons, it was thought advisable that the subject of internal diseases should be intrusted to different hands from those which had been charged with the anatomical, physiological, hygienic, and surgical departments.

The avowed author has added occasional comments and incidental observations or opinions, in the course of the strictly medical chapters, and here his connexion with them properly ceased. He regrets that circumstances induce his coadjutors to decline the announcement of their names, and feels that some apology is necessary for the acknowledgment of his own, when unattended by theirs. The motive may be briefly stated.

When a writer presumes to address the public on subjects of high importance, and such as are usually regarded as recondite,—especially if his subject matter be drawn from general study and experience, without

compilation, or frequent reference to special authorities,—the value of his labours depends chiefly upon his opportunities for the acquisition of information, and the confidence felt in his mode of employing those opportunities. In other words, his personal character and position are necessary elements in the calculation of the dependence which should be placed upon his dicta. A book upon a scientific subject, unsupported by any name is, therefore, justly regarded with some suspicion; and, whether the name, when appended, be calculated to elevate or depress its character, there is justice in its announcement.

It is true, most of the facts and doctrines contained in the following pages may be regarded as the common property of the profession; yet there are not wanting frequent individual opinions, and practical observations, which require a sponsor for the legitimacy of their deduction, or the accuracy of their statement. No parade of these original remarks is attempted. They will be recognised at once, by those who are proficient in the science, and to such, alone, the question of their origin is interesting.

For these reasons, the projector, and principal writer of the work, has thought it incumbent upon him to attach his name to the volume, although the step is taken with some reluctance; partly, because there are those of his fraternity, who disapprove such undertakings; and partly, because it places his name in juxtaposition with that of some previous authors, whom to rival, or with whom to affiliate, falls not within the compass of his ambition.

Had the author aimed at reputation, he might have said much, with justice, in extenuation of defects of style; but if he have succeeded in composing a book of real utility, he cares little for any reputation which may flow from it.

The book is before the public. Let it stand or fall by its own merits. All that is asked for it, is a fair examination.

# CONTENTS.

---

PREFACE, - - - - -	Page 5
--------------------	--------

## PART FIRST.

OUTLINES OF ANATOMY, PHYSIOLOGY, AND HYGIENE,	15
---	----

## CHAPTER I.

PRELIMINARY REMARKS ON THE ORGANIZATION OF ANIMALS, - - - - -	17
--	----

## CHAPTER II.

STRUCTURE OF THE HUMAN BODY, - - -	25
Of the cellular tissue, - - - - -	25
Of fat, or adipose tissue, - - - - -	29
Of the bones, or osseous system, - - - - -	31
Of the skeleton, - - - - -	36
Of the muscles or muscular system, anatomy, - - - - -	56
Of the digestive apparatus, - - - - -	67
Of the stomach, - - - - -	73
Of the duodenum, - - - - -	75
Of the liver, - - - - -	76
Of the pancreas, - - - - -	78
Of the small intestine, - - - - -	79
Of the great intestine, - - - - -	81
Of the circulation, - - - - -	83
Of the circulating fluids, - - - - -	83
Of the route of circulation, - - - - -	86
Of the portal vessels, - - - - -	89
Of the capillaries, - - - - -	91
Of the function of nutrition, - - - - -	92
Of the function of absorption, - - - - -	93
Of respiration, - - - - -	95
Of the apparatus of respiration, - - - - -	95
Of secretions, - - - - -	102

	Page
Of the urinary apparatus, - - - - -	103
Of the urine, - - - - -	106
Of the skin or integument, - - - - -	107
Of the nerves, - - - - -	111
Of the brain, - - - - -	118
On the duplicature of certain organs, - - - - -	122

## CHAPTER III.

PHYSIOLOGICAL REMARKS, - - - - -	126
Of assimilation and nutrition, - - - - -	126
Of the reproduction of parts as displayed in the healing of wounds, - - - - -	133
Of symptomatic fever, - - - - -	135
Of irritation and hyper-nutrition, inflammation, physiological, - - - - -	147
Of capillary irritation, - - - - -	153
Of nervous irritation, - - - - -	159
Of the balance of vital action and re-action, - - - - -	162
Of vicarious discharges and transformations of tissues, - - - - -	163

## CHAPTER IV.

REMARKS ON HYGIENE, - - - - -	166
Of food, - - - - -	166
Of clothing, - - - - -	183
Of air and moisture, - - - - -	197
Of exercise, - - - - -	206
Of the food and exercise of children, - - - - -	213
Errors of female school discipline, - - - - -	220
Of matrimony, - - - - -	226

## PART SECOND.

PRACTICAL DIRECTIONS FOR THE TREATMENT OF MEDICAL AND SURGICAL DISEASES, - - - - -	235
---	-----

## CHAPTER I.

OF SURGICAL ACCIDENTS AND DISEASES, - - - - -	235
SECT. 1. Of wounds and contusions, - - - - -	235
Of incised wounds, - - - - -	236
Of incised wounds of the scalp, - - - - -	247
Of incised wounds of the neck and throat, - - - - -	248
Of incised wounds of the chest, - - - - -	249
Of incised wounds of the abdomen, - - - - -	250
Of incised wounds of the joints, - - - - -	252
Of lacerated wounds, - - - - -	254
Of contused wounds, - - - - -	259
Of contusions, - - - - -	261
Of injuries of the head, - - - - -	263
Concussion of the brain, - - - - -	265
Fractures of the skull, - - - - -	268
Of contusions in the cavity of the spine, - - - - -	271
Of fractures, dislocations, and sprains of the spine, - - - - -	271
Of concussions of the spine, - - - - -	273
Of contusions of the chest, - - - - -	274



	Page
Of contusions of the abdomen, - - -	275
Of contusions of the pelvis and perineum, - - -	278
Fractures of the pelvis, - - -	279
Of contusions or sprains in the joints, - - -	281
Of punctured wounds, - - -	283
SECT. 2. On the dilatation of natural passages, and its consequences, - - -	285
Dilatation of the anus, - - -	287
Of dilated or varicose veins, - - -	290
Of varicocele, - - -	293
Of piles, or hemorrhoids, - - -	296
Of dilatations of the heart and arteries, - - -	298
Of aneurisms, - - -	298
Of aneurismal varix and varicose aneurism, - - -	299
Of mother-spots, or aneurism from anastomosis, - - -	300
Of hernia, or rupture, - - -	302
SECT. 3. On deformities from imperfect nutrition of the osseous and muscular systems, - - -	311
Of curvatures of the spine, - - -	311
Of club foot, - - -	318
SECT. 4. Of fractures, - - -	319
Fractures of the clavicle, - - -	321
Fractures of the shoulder blade, - - -	323
Fractures about the shoulder joint, - - -	323
Fractures of the arm, - - -	323
Fractures of the elbow joint, - - -	324
Fractures of the fore-arm, - - -	325
Fractures of the lower extremities, - - -	325
Fractures of the thigh, - - -	326
Fractures of the leg, - - -	327
Fractures of the fingers and toes, - - -	328
Fractures of the lower jaw, - - -	329
Of dislocations in general, - - -	330
Dislocation of the arm into the arm-pit, - - -	331
Dislocations of the wrist, - - -	332
Dislocation of the ankle, with fracture of the fibula, - - -	332
SECT. 5. On inflammation and its consequences, - - -	333
External inflammations, - - -	333
Terminations of inflammation, - - -	334
Treatment of inflammation, - - -	335
Of suppuration, - - -	337
Of ulceration, - - -	338
Of gangrene, - - -	342
Malignant pustule, - - -	342
Gangrene of old men, - - -	342
Dry gangrene, - - -	343
Gangrene from excess of inflammation, from internal and constitutional causes, - - -	343
Gangrene from pressure, - - -	344
Gangrene from cold, - - -	344
Gangrene from mechanical injuries, - - -	345
Terminations of inflammation coupled with collapse, - - -	346
Of the sty, - - -	349
Ulceration of the eye-lashes, - - -	349
Foreign substances in the eye, - - -	350
Inflammation of the eye, - - -	351
Ulceration of the cornea, - - -	354
Films on the eye, - - -	354
Foreign bodies in the ear, - - -	355
Ear-ache, and suppurations of the ear, - - -	356

	Page
Ulcerations of the mouth, - - - - -	356
Gum-biles, - - - - -	357
Suppurations of the urinary passages, - - - - -	357
Excoriations about the mucous orifices, - - - - -	359
Chafing, - - - - -	359
Of abscesses, - - - - -	359
Run-round, - - - - -	361
Whitlow - - - - -	361
Nails growing into the flesh, - - - - -	362
Biles, - - - - -	363
Furuncle and carbuncle, - - - - -	364
Canker, or gangrenous sore mouth of children, - - - - -	366
Burns and scalds, - - - - -	368
White swelling, - - - - -	370
Hip-joint disease, - - - - -	371
SECT. 6. Corns, warts, and moles, - - - - -	373
Soft corns, - - - - -	374
Warts, - - - - -	375
Moles, - - - - -	375
SECT. 7. Constitutional diseases, - - - - -	376
Scrofula, - - - - -	376
Of cancer, - - - - -	378
Venereal disease, - - - - -	380
Scurvy, - - - - -	384

## CHAPTER III.

MEDICAL PRACTICE OR TREATMENT OF INTERNAL DISEASES, - - - - -	387
SECT. 1. Fever, - - - - -	387
Intermittent fever, - - - - -	388
Continued fever, - - - - -	393
Bilious remittent fever, - - - - -	400
Yellow fever, - - - - -	401
Petechial or spotted fever, - - - - -	403
SECT. 2. Eruptive diseases, - - - - -	405
Small-pox, - - - - -	405
Varioloid, - - - - -	409
Chicken-pox, - - - - -	409
Cow-pox, - - - - -	410
Measles, - - - - -	412
Scarlet fever, - - - - -	413
Miliary fever, - - - - -	415
Nettle-rash, - - - - -	416
Prickly heat, or lichen, - - - - -	417
Shingles, - - - - -	417
Ring-worm, - - - - -	418
Itch, - - - - -	418
Rose-rash, - - - - -	419
Gum-rash, - - - - -	420
Pruriginous rash, - - - - -	420
SECT. 3. Erysipelatous affections, - - - - -	421
Poisoned wounds, - - - - -	422
Erysipelas phlegmonodes, or diffused inflammation of the cellular tissue, - - - - -	425
Inflammation of the veins and absorbents, - - - - -	426
SECT. 4. Diseases of the respiratory apparatus, - - - - -	428
Catarrh, - - - - -	428
Influenza, - - - - -	430

	Page
Pleurisy, - - - - -	431
Lung fever, - - - - -	432
Consumption, - - - - -	435
Spitting of blood, - - - - -	439
Pulmonary hemorrhage, - - - - -	440
Asthma, - - - - -	441
Angina pectoris, - - - - -	443
SECT. 5. Diseases of the throat, - - - - -	444
Mumps, - - - - -	444
Quinsy, - - - - -	444
Croup, - - - - -	447
SECT. 6. Diseases of the abdomen, - - - - -	449
Cholera morbus, - - - - -	449
Spasmodic or malignant cholera, - - - - -	450
Diarrhœa, or looseness, - - - - -	454
Dysentery, - - - - -	457
Colic, - - - - -	459
Painter's colic, - - - - -	462
Liver complaint, - - - - -	464
Inflammation of the kidney, - - - - -	466
Jaundice, - - - - -	467
Passage of gall stones, - - - - -	468
Worms, - - - - -	470
SECT. 7. Diseases of fibrous tissue, - - - - -	473
Rheumatism, - - - - -	473
Gout, - - - - -	476
SECT. 8. Nervous diseases, - - - - -	479
Chorea, or St. Vitus's dance, - - - - -	479
Shaking palsy, - - - - -	480
Convulsions, - - - - -	481
Epilepsy, - - - - -	481
Hysteria, - - - - -	482
Cataplexy, or trance, - - - - -	483
Apoplexy, - - - - -	484
Palsy, - - - - -	487
SECT. 9. Prominent symptoms and accidents, - - - - -	488
Dropsy, - - - - -	488
Heart-burn, - - - - -	492
Water-brash, - - - - -	493
Flatulence, - - - - -	493
Costiveness, - - - - -	494
Indigestion, or dyspepsia, - - - - -	497
Vomiting, - - - - -	502
Hiccough, - - - - -	504
Cramp, - - - - -	505
Bleeding from the nose, - - - - -	507
Strangury, - - - - -	508
Diabetes, - - - - -	509
Gravel, - - - - -	509
Drowning, - - - - -	511
Death from suspension, - - - - -	512

## CHAPTER III.

DISEASES OF MARRIED WOMEN, - - - - -	513
Of pregnancy, and the position and connexions of the child	
in the womb, - - - - -	513
Approach of labour, - - - - -	518
Of labour, - - - - -	520

	Page
Uterine hemorrhage, - - - - -	526
Of puerperal convulsions, - - - - -	527
Inversion of the uterus, - - - - -	530
Inflammation of the womb, - - - - -	531
Puerperal fever, - - - - -	532
Swelled leg, milk leg, or phlegmasia dolens, - - - - -	534
Puerperal nervousness, mania, and melancholy, - - - - -	535
Of palsy of the bladder, - - - - -	537
Of swelled throat, - - - - -	537
Inflammation and abscess of the mamma, - - - - -	537
Of inflammation of the nipple, - - - - -	539

## CHAPTER IV.

ON DISEASES OF CHILDREN, - - - - -	541
Tongue-tie, - - - - -	541
Swelled breasts, - - - - -	542
Sore navel, - - - - -	542
Of the yellow skin and jaundice of infants, - - - - -	543
On retension and suppression of urine, - - - - -	545
On painful urination, - - - - -	546
Incontinence of urine, - - - - -	547
Excessive urination, urinary consumption, or diabetes, - - - - -	547
Sore mouth, thrush, aphthæ, - - - - -	548
Colic, - - - - -	551
Costiveness, - - - - -	554
Vomiting, - - - - -	555
Erysipelas, - - - - -	557
Dentition, - - - - -	558
Worms, - - - - -	561
Convulsions, - - - - -	561
Dropsy in the brain, - - - - -	562
Whooping-cough, - - - - -	563
Inflammation of the tonsils, quinsy, - - - - -	566
Cholera infantum, - - - - -	567

## CHAPTER V.

ON DISEASES OF ADULT FEMALES, - - - - -	570
Appearance of the menses, - - - - -	570
Chlorosis, or green sickness, - - - - -	570
Suppression of the menses, - - - - -	572
Obstructed menstruation, - - - - -	573
Painful menstruation, - - - - -	573
Excessive menstruation, or flooding, - - - - -	574
Final cessation of the menses, - - - - -	575
Leucorrhœa, fluor albus, or whites, - - - - -	576
Pruritis vulvæ, - - - - -	576
Falling, or prolapsus of the uterus, - - - - -	577
Retroversion, or falling of the womb backwards, - - - - -	579
Antiversion of the womb, - - - - -	579
Polypus of the uterus, - - - - -	580
Cancer of the uterus, - - - - -	580
Appendix, - - - - -	583
Formulary, - - - - -	583
List of drugs, - - - - -	596
List of apparatus, - - - - -	599
Index to the first part, - - - - -	601
Index to part second, - - - - -	607
Errata, - - - - -	615



## CHAPTER I.

### PRELIMINARY REMARKS ON THE ORGANIZATION OF ANIMALS.

WHEN we look at the wonderful machine which the Deity has placed upon the earth to preside over his creation—when we consider the beautiful adaptation of its various parts to the purposes for which they are designed—we are struck with awe and admiration, even upon a superficial glance at its beauty and propriety. But when we penetrate beneath the surface, and behold the play of its ten thousand arteries carrying sustenance to every part of the system—the veins returning their purple current to the heart and lungs, to be resupplied with the elements of life,—when we observe the lacteals taking up the nutritious particles from the bowels, and conveying them through countless channels to be mingled with the blood—the absorbents removing those parts which are no longer fitted to fulfil their duty, and the glands rejecting them from the body as useless incumbrances, while the vessels again supply their place with fresh materials,—when we reflect, I say, that this most intricate machine is so constantly undergoing waste and repair, that in a very few years it loses every individual atom which formed a part of its original structure, while it still preserves its form and motions unimpaired, we are lost in wonder; not less at the wise ordinations of Nature that regulate its operations, than at the audacity of those who dare to interfere with her arrangements, even when disorder is perceived among the wheels and springs of this masterpiece of Divine wisdom and power.

But Nature governs all her works by a few simple laws; and when these laws are discovered, the explanation of her most involved phenomena are often brought within the grasp of human reason. By contemplating the fall of an apple, Newton was enabled to expose the hidden cause of all the movements of the heavenly bodies. Now, although we have not arrived at nearly the same simplicity in the study of the science of life which that philosopher has reached in speculating

on Natural Philosophy, we have discovered many general principles which shed no inconsiderable light on the otherwise incomprehensible operations of the human frame in health and in disease. Let us, then, proceed to elucidate these principles, as far as the limits and the object of this work will permit.

The simplest of all animals—which mostly reside in the water—appear to be entirely divested of feeling, or voluntary motion; they have no blood vessels, no nerves, no intestines, no organs; they are composed of a kind of membrane containing many cells and fibres of different shapes and sizes, filled and surrounded with a peculiar fluid. In structure they are not unlike a sponge, enclosed in a bladder of the same substance, and shaped into different forms according to the species. In composition this membrane does not differ very widely from the white of an egg when boiled. Such is the picture of the simplest specimens of animal life, and although the labours of recent naturalists have proved the existence of more complex organs in many of the tribes of minute beings, whose existence is scarcely perceptible, except by the aid of powerful microscopes, there are not wanting many of much larger size, and, therefore, open to accurate observation, in whom the whole body is devoid of any systematic arrangement, other than that which has been just described.

These animals live by imbibing their sustenance through the skin from the fluid in which they swim, and as they select such particles as are fitted to their wants, they may be said to perform a kind of external digestion. The membrane of which they are composed is supposed to contract when touched, and also, when acted on by light, heat, electricity, and, perhaps, other causes; thus the fluids which it contains are agitated and moved from place to place, so that an imperfect kind of circulation is effected without the aid of blood vessels, and all parts of the body are nourished and furnished with the means of growth. If respiration be necessary to these animals, it must be effected by the external surface, and whatever matters require to be ejected from the body are compelled to pass by the same route. This substance, of which they are composed, and which is called cellular membrane, or cellular tissue, seems, therefore, to be capable of fulfilling all the functions of life, as far as they are necessary to the existence of the most simple animals, and, strange as it may appear, even the human embryo, when it first becomes visible, and for some time afterward, cannot be distinguished from a small mass of cellular tissue! Although it is obvious that it must be endowed with life, it contains no vessels nor organs, but resembles a mere piece of animated jelly.

When we begin to examine animals more and more advanced in the scale of nature, we find that those which are designed to move about in search of food, instead of having their food brought to them, require to be furnished with organs especially devoted to this purpose. They have muscles: for the occasional, and, as it were, accidental contractions of the cellular tissue are too irregular and uncertain to answer their necessities, and they require an apparatus for LOCOMOTION. From the moment that the character of perfect simplicity is thus lost, it seems that mere absorption from the surface is insufficient to supply the materials for the different organs, and the animal is supplied with an internal cavity or stomach, and bowels more or less complex in structure, in which food may be enclosed until it can undergo a more careful and deliberate DIGESTION. Still these muscles, of which we have spoken, though they look like fibres of considerable length, are thought, by most, to be in reality composed of globules or particles, ranged in rows in the midst of the cellular tissue, which ties them together in bundles and keeps each particle in its proper place; they are strictly interstitial deposits, filling the cavities and adhering to the layers of the membrane.

Now the movements of the muscles would be embarrassed and, perhaps, destroyed, if the liquids which support life were permitted to pervade the whole body, in these, as they do in the simplest animals, which have no well defined organs; the nutritive fluid or blood, is, therefore, generally enclosed in distinct vessels, formed ultimately of the same cellular tissue, but having no communication with its cells. These vessels divide and redivide, carrying the blood to every part of the body, and returning it again to a reservoir, or *Heart*, which forms the centre of the CIRCULATION.

As every part of the body receives its nourishment from the blood, it is obvious that this fluid is constantly undergoing considerable waste; nature has, therefore, provided a system of vessels which is rather an appendage to the circulatory apparatus than a part of it. These vessels, which physicians call the *Lacteals*, arise in countless numbers from every part of the bowels. They take up, by some invisible means, such parts of the food as are suited to enter the blood, leaving the rest to be ejected from the body by the natural passages. They pursue a winding course, uniting gradually with each other, and thus becoming larger, as the little streams from a thousand springs are slowly collected first into rivulets, then into brooks, until, at length, they give rise to a noble river. The river of the lacteals into which they are all finally collected is, in man, a vessel about as large as a crow-quill, which, running for some distance along the spine, near the back part



of the chest, empties its contents into one of the principal veins of the body just before it enters the heart.

*The Heart* is a strong hollow muscle, which alternately receives the blood as it flows toward it, and then forces it by a strong contraction through vessels, which go on continually branching until they reach every part of the system, like the limbs and twigs of a great tree.

The principal trunk and great branches of this class of vessels are termed *Arteries*; the blood is propelled through them chiefly by the direct force of the heart, but they are provided with a coat or envelope of fibres resembling those of muscles, which aid in urging the current more uniformly in proper directions, and as the arteries grow smaller, these fibres increase in their relative strength, as the bark of the smaller twigs become thicker in proportion, than that of the body of the tree. At length these little arteries become capable of hastening or retarding the flow of blood, and sometimes, perhaps, they check it altogether for a moment. They now change their name, and are called the *Capillaries*.

It is through the capillaries that all those particles which are required for the growth and preservation of the body and its several organs, are separated from the blood and placed in their proper stations. The same vessels are supposed by some to take up and mingle with the blood those particles which have done their duty and are worn out in the service, in order that they may be disposed of, in the manner in which most bodies corporate reward the past services of friends no longer found necessary; that is, by being turned out of doors. In this most thankless duty, however, they are certainly aided by a subsidiary class of vessels called the *Absorbents*, which convey only colourless fluids collected from all parts of the body. Most of these last named vessels, finally empty their contents into the common trunk of the lacteals, and thus into the veins; but some of them reach the same destination by a more direct route.

This constant addition of nutritive matter to the blood by the *lacteals*, its distribution to every organ of the animal by the *heart and arteries*, its separation from the mass of circulation, and its application to the growth and repair of all parts by the *capillaries*, together with the removal of injured, useless, or debilitated particles by the *absorbents*, are subjects connected with the all-important process of NUTRITION.

After the blood has passed the capillaries it falls into another system of vessels called the *Veins*, by which it is returned to the heart. The veins are destitute of the seemingly muscular coat of the arteries and capillaries, and although the blood is constantly pushed into them by the joint action of



the heart, the arteries, and the capillaries, they are unable to propel it by any effort of their own; they are mere passive conduits. To supply this apparent defect, they are provided with numerous valves, set here and there along their course, which permit the blood to pass toward the heart, but prevent its return in the opposite direction. By the constant motion of the muscles in breathing, walking, coughing, sneezing, &c., the veins are very frequently compressed, and their contents urged forward more rapidly; hence the healthfulness of exercise and gymnastics, but of this I shall speak more fully in the chapter on Hygiene. All the veins of the body are gradually collected into a few great trunks or canals, which pour their contents into the heart, and those which belong to the *general circulation*,—that circulation which is destined to supply nutriment to the body—form, in the more perfect animals, two great conduits; one coming down from the head and upper extremities, the other coming up from the trunk and inferior extremities. These conduits meet directly end to end, so as to form but one trunk, which opens into the heart by a gap at the side.

The blood thus returned is of course altered, in the first place, by having parted with a great deal of matter for the repair and growth of the different organs, and secondly, by being loaded with all the useless particles which the absorbents have taken up. In order then that it may be fitted for circulating again, it must receive considerable additions and it must cast off considerable impurities. The former are supplied by the lacteals, but the latter process requires a different set of vessels endowed with other powers.

One of the chief impurities which the blood receives from the absorbents is carbon or charcoal. To rid it of this, a part, and in the more perfect animals, the whole of the blood, is made to pass through an organ where the vessels come almost into contact with the element in which the animal lives, as the water in fishes, and the air in birds and man. Both these elements contain oxygen or vital air, and by some hidden means, the carbon of the blood, being supposed by most to unite with this vital air, escapes through the thin coats of the vessels in the form of carbonic acid gas, the same gas that rises from fermented liquors, soda water, &c. Thus, we see some animals breathing water, and others, air. The former, generally have the breathing organs placed externally; they are termed *Branchiæ* or *gills*; in the latter, they are situated within the body, and are called *Lungs*, or *lights*. The function performed by these organs is called *RESPIRATION*.

It is believed by many physiologists that nature, always un-

willing to perform any useless labour and anxious to effect as many operations as possible with a very few materials, has so ordered the laws of respiration that it shall preserve the warmth of the animal at the same time that it purifies the blood. While the blood is acted upon by the atmosphere in the lungs, or by the water in the gills, it is supposed to absorb a great quantity of heat, and as it flows towards every part of the body, undergoing a gradual change, it is thought to throw out this heat, and thus to keep every part at its proper temperature.

The effects of respiration are not sufficient to remove all the impurities of the blood, and, therefore, a number of curious organs, called *Glands*, are provided, some of which aid in separating many of these impurities, each gland furnishing its own peculiar fluid, which it pours out either into the bowels or into the skin. The product of many of these glands is made useful for various purposes before it is thrown off from the body; thus the liver, the largest of the glands, forms the *bile*, which is the natural purgative, producing, when healthy, regular and comfortable stools; and when diseased, occasioning costiveness or bowel complaints: the pancreas and the glands about the mouth pour out the *spittle* which assists digestion. These useful fluids are called *Secretions*, but those which are ejected, like the urine, without fulfilling any important purpose, are called *Excretions*.

From what has been said, it is obvious that the motions necessary to maintain life even in very simple animals are numerous and complex. The stomach and intestines must receive and digest food; the lacteals must take up the nutritious part of the food and carry it to the blood; the arterics must convey this blood to the different organs; the capillaries must supply the growth and waste of those organs; the absorbents must aid the capillaries in taking away the worn out and useless parts to mingle them with the blood in the veins; these vessels must convey the blood back to the heart, which must then pass it to the lungs to be deprived of some of its impurities, and to enable it to sustain the heat of the body. In addition to all this, the glands must assist in purifying the blood, or they must furnish fluids to aid in digestion and other functions, or to purge away those useless remains of the food, which cannot be digested. So many different motions all dependent on each other, would necessarily produce continual confusion, by acting irregularly and to cross purposes, if they had not some common bond of union by which they can mutually inform each other, as it were, of their several wants and actions. This bond of union is furnished by the *NERVES*.

In the more simple animals, we find only a few nervous fibres running in different directions, with here and there little knots called *Ganglions*, joining several fibres together. When any impression is made upon one of these fibres, it is instantly communicated to the parts with which it is connected, and calls them into action. If the fibre is united with others, or with one or more of the little knots just mentioned, they are also called into action, and several different parts are then put in motion at once. Thus when food enters the stomach, its nerves receive the impression and cause the capillaries of that organ to dilate in order to receive the blood required to carry on the process of digestion; they also give notice to the heart, which, if necessary, acts with more force in hastening the circulation, and the capillaries of the skin contract and drive the blood from the surface toward the bowels. This is the cause of the slight chill and consequent fever so often felt during and after a hearty dinner. The animal, however, remains unconscious of all this hurry of business within, and the nerves which are the messengers and agents of the manufactory are called *the nerves of organic life*. They are altogether independent of the will, and are found in animals supposed to have no brain.

In beings of a higher order, that are obliged to choose their food with judgment, and to travel far in search of it, other nerves are required to enable them to recognise its presence; these are *the nerves of sensation*. There must also be a BRAIN to enable the animal to judge of its impressions, and to perceive its wants, and another system of nerves is required to pass from the brain to the different muscles, by which the former may direct the motions of the latter; these are *the nerves of voluntary motion*. All these several systems, though, in some degree, independent, are connected together by the brain and the little knots or ganglions, so that they mutually influence each other.

Finally, to enclose and protect this multifiform and delicate structure, there is a coat of condensed cellular tissue covering the whole body, and called the *true skin*, over which is spread a thin layer of horny matter called the *cuticle* or scarf skin. This cuticle is totally insensible, and forms a mere crust which protects the delicate and exquisitely sensitive surface of the true skin. The horns, nails, hair, spines, shells, and crusty coverings of various animals, are all classed properly with the cuticle, being either excrescences of, or substitutes for, that membrane.

Each of the parts of an animal that have now been enumerated may be found even in a common snail, or in the meanest of the reptiles; but, as we ascend in the scale of nature,

every system of organs is observed to become more and more complex in structure, and capable of actions more and more various.

Man, the most perfect of animals, not only requires the whole of this complex apparatus, but his brain also contains systems of nervous fibres, for the exercise of the higher instincts, moral feelings, and reasoning faculties. He is at first nothing but a little mass of cellular tissue ; but as the infant in the mother increases in size, one organ is added after another, nearly in the order described, and many of his parts do not reach their full development until he approaches middle life.

We will now proceed with a hasty review of the several parts and systems which compose the human body, with such notice of their action as our narrow limits will permit, pursuing the order in which we have already arranged the principal functions which belong to all animals.



## CHAPTER II.

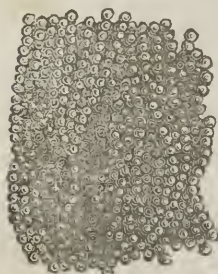
## STRUCTURE OF THE HUMAN BODY.

IN describing a machine composed of a thousand parts, all so connected that they cannot act separately and independently, but must mutually assist each other in every operation, it is extremely difficult to select a point from which to commence our narrative. We shall be occasionally compelled while describing one organ or one system, to speak of others, that have not been brought before the reader. When treating of the nature of the muscles, for instance, we cannot avoid alluding to the nerves from which they derive their power. But it is hoped that the general view contained in the previous chapter will render the contents of the present sufficiently intelligible.

## OF THE CELLULAR TISSUE.

If it were possible to remove from the body every thing which gives to each of the different organs its peculiar character; if we were to take away all the hard parts of the bones, all the red parts of the flesh, all the pulpy parts of the brain and nerves, &c., we should still find the form of the body preserved. It would then be converted into a simple mass of cellular membrane, containing the same cavities which we see in the perfect body; but most of the places from which the particles of the organs had been removed, would be too small for the naked eye to detect them. Now, it has been already mentioned that this membrane appears to form the whole body of the child when it first becomes visible a few weeks after conception. It is, therefore, the foundation of the whole structure of man. Its cavities form his blood vessels; its outer surface is the skin, and its inner surface, the bowels; and all the different organs are made up of matters deposited within its little cells.

Cellular membrane, when carefully examined, is found to be formed entirely of innumerable little fibres, of every variety of shape and size, running together in every possible direction, so as to form a mass very similar to a common sponge, but with intervals extremely small in most places. These fibres, under the microscope, appear to be ultimately composed of globules like those of the muscles, but this subject is still involved



in doubt. The marginal fig. I. represents this appearance. In some situations these fibres are narrow, loose, and comparatively distant, like the meshes of a net, in others, they are broad and close, so as to form partial cells, which communicate with each other on all sides. The sides of these cells and the meshes of the network just mentioned, are prevented from adhering together by a fluid formed out from the membrane itself, or from the blood vessels, which keeps them always moist, and when this fluid becomes too great in quantity, in consequence of disease, the patient labours under general dropsy. The swelling of the feet when standing, and their return to the proper shape during the night, so often noticed in weakly persons, furnish a beautiful proof both of the existence of this membrane and of its peculiar structure, which allows the fluid to flow from cell to cell until it settles in the lowest point.

But if the cellular tissue were every where open and penetrable to this extent, it is evident that it could neither confine the blood and other fluids in their proper course, nor could it effectually support the various organs in their correct position. Moreover, where one part is intended to slide over another, as it is the case with the bowels, for instance, which are constantly changing their size and position as the food passes through them, would be very inconvenient to have these parts tied together by close cellular tissue, for this bond would either prevent their proper motives, or it would be continually stretched and torn by them.

To avoid these difficulties, nature has modified the arrangement of the cellular tissue in different parts of the body, in several ways. In some places, the sides of the adjoining cells are united together over a considerable space, so as to form a broad sheet of membrane, through which fluids cannot pass; and these sheets are applied on those parts which are intended to move upon, or glide over each other. Thus, the bowels are covered by such a membrane, which is united to them by loose cellular tissue on one side, but on the other, remains perfectly smooth. After covering each bowel, like an over-

coat, it passes in a double sheet to the spine, and spreads itself out on each side, so as to form a lining to the whole inside of the abdomen or belly—the cavity in which the bowels are placed.—One of these membranes exists in each of the great cavities of the body; in the head, to facilitate the motion of the brain; in the chest, to allow proper play to the lungs, and in the abdomen, to hold the intestines in their places without preventing them from receiving and expelling their contents by their peculiar movements.

The same arrangement is noticed on a smaller scale in some other parts of the body, but the three instances just given, are the most important. These membranes are called the *Serous Membranes*, and the sacs formed by them are called the *Nervous Cavities*. They may be regarded as so many vast cells of the common cellular tissue, not communicating with the neighbouring cells, but completely closed on all sides. As we have compared the cellular membrane, in general, to a sponge, we may now compare the serous membranes to as many wet and empty bladders spread through the substance of the sponge, to which they are glued fast on the outer side. Their chief object is to prevent friction. They are kept always moistened when in health, by a serous fluid very similar to that which is found in the smaller cells, but when this fluid collects in too great quantity it cannot subside toward the feet as it does in general dropsy, but remains shut up in the sac, forming a dropsy of the belly, of the chest, or of the brain, according to the cavity in which the disease is seated.

Every moveable joint in the body is provided with a similar sac or bladder, which lies between the ends of the different bones, or rather, between the caps of cartilage or grizzle which covers them. The fluid contained in the cavities of the joints differs a little from common serum, and answers the same purpose with the oil used in machinery to prevent friction.

In many places, where a number of different muscles are frequently called into action at one time, they require to be bound down firmly, to prevent them from getting out of place when the limb or member changes its position. This is effected by another arrangement of the cellular tissue; by which a considerable portion of this spongy matter is compressed into the form of an apron, the cells being nearly or entirely obliterated, and the whole texture of the part rendered firmer by an increase of the number and strength of the fibres, which seem matted together like tangled hair. Membranes of this kind are connected with the general cellular tissue on both sides. When large and broad, they are called *Fasciæ*. One of the best marked fasciæ in the body, covers and binds down the

muscles of the thigh, and, were it not for its presence, the thousand graces of a VESTRIS or TAGLIONI would be converted into horrible deformity by the muscles, which would start up like cords at every change of the dancer's position, until all symmetry would disappear. Some of these fasciæ evidently resemble the general cellular tissue, simply condensed to a greater or less degree; almost every muscle, and many of the important blood vessels and nerves are completely surrounded by sheaths of this nature, more or less delicate in structure. The true skin, as we shall see hereafter, is formed in a very similar manner, but when membranes of this class are very strong, like those which bind down the tendons of the wrist and hand, they begin to appear more distinctly fibrous, to the naked eye, and in the proper ligaments which bind together the different bones, the cellular character is so completely lost or hidden that considerable care is required to demonstrate its presence. One of the closest and firmest of the membranes formed from the cellular tissue is that which covers the bones, and is called, by anatomists, the periosteum. It is necessary that it should be very strong and close, for, if it were to slide ever so little, in consequence of blows or other injuries, the vessels which pass through it to feed the bone beneath, would be torn off, and a part of the bone would be liable to die or mortify, for want of support. Yet, even this periosteum, fibrous as it appears to be, is really cellular, and when a bone is broken, we see its cells dilated and enlarged, until the membrane becomes soft and pulpy, and often twenty times as thick as it is in common, in order that its blood vessels may be allowed to enlarge and to make room for the bony matter necessary to mend the fracture.

To prove the existence of the cellular tissue in the substance of all the different organs, is a task of some difficulty, and although it has been demonstrated, again and again, by modern anatomists, neither the limits of this work nor the patience of its uninitiated readers, will warrant us in pursuing the detail. It is hoped, that what has been said, will suffice to give a clear idea of the nature of this fundamental tissue, and whatever additional information is found necessary to our purpose in writing a popular treatise, will be given under other appropriate heads.

The cellular membrane is not very liable to disease, except when it contains other matters than those which belong to its own proper texture, and when it is formed into distinct organs, such as we shall presently describe. The history of those animals which appear to be entirely composed of it, is so little known that its vital actions can hardly be ascertained by observations made upon them; and in the human body, it



is so involved and concealed by the operation of other more complex parts, that it is difficult to ascertain its independent agency. It is liable to become diminished or increased in bulk, by the increase or diminution of its contents, and probably, by the absorption or unnatural growth of its own substance also. When it contains other solid substances, as in the muscles or bones, these may be removed by disease, and the part may be reduced to simple cellular tissue, and when injuries have destroyed a portion of bone, or muscle, the neighbouring portions of this tissue are capable of transforming themselves in time, so as to supply the deficiency. When any part of the body is cut away, the wound heals first by the development, or, if necessary, the reproduction of a portion of this tissue, which afterwards receives, more slowly, the peculiar character of the part removed. This reproductive power is observed to increase as we descend in the scale of nature, toward animals of more simple structure: thus, lizards and lobsters, when one of their limbs is cut off, renew it in a short time; and among the worms, when cut in half, we sometimes see each half forming a perfect animal. In man, however, this power is so limited that some eminent physiologists deny its existence, but the weight of sufficient authority is not wanting to prove the correctness of the views just stated.

The cellular tissue frequently mortifies, and comes away in large pieces through openings made in the skin, as often happens in the worst forms of erysipelas, but this appears rather to result from its being cut off from its proper supply of nourishment, than from any diseased action of its own—and it happens much more readily, where the tissue is soft and compressible, than where it is much condensed and firm.

#### OF FAT OR ADIPOSE TISSUE.

Fat is an animal oil, which is secreted in very minute drops, each shut up in a separate cell, composed of membrane so extremely delicate, that its existence is scarcely perceptible. These cells are supposed, by many, to be perfectly closed, but their structure has never been fully demonstrated. Several drops, with their envelope, are again surrounded by a similar membrane, but a little thicker; a number of these primary groups are again collected under a still firmer covering, and so on, until considerable masses are formed, which are held in place, by the common cellular tissue, in the cavities of which they are placed.

Most physiologists consider this membrane as distinct from the cellular, and call it the adipose tissue, but their position is hardly sufficiently established.

Masses of fat are always found in particular parts of the cellular tissue, where they sometimes serve the purpose of cushions, as is the case under the skin of the palm of the hand, and sole of the foot. Very often they seem designed to give bulk, freedom, and symmetry, to important parts, which are complex in structure, as in the female breasts, and many other glands.

But one of the most important uses of the part, is to supply the system with support, when, in consequence of the deprivation of food, either from loss of appetite, in disease of the bowels, or from hard necessity, the natural supply is cut off. Thus, we find that more bleeding, and a longer continuance of low diet, is generally necessary, when inflammation attacks persons in high keeping, than when it occurs in those who are lean, and have no such reservoir within themselves. Much of the fat is taken up by the absorbents during long sickness, and is conveyed by them into the blood, so as partially to supply the want of chyle; and this is the chief cause of the "falling away" of the person under such circumstances.

The adipose tissue is liable to few diseases, but when it is deposited in too great amount, it is often found in the condensed cellular tissue, where nature never designed that it should appear. It then softens these more solid parts, and produces general weakness, so that very fat persons are rarely healthy. Sometimes it collects in masses, out of its proper place, and forms tumours, which may reach a great size, but they are not dangerous unless they prevent the proper action of the neighbouring parts. They are different from wens, and generally occur in many places at one time, and they should not be meddled with, unless they give considerable inconvenience; in which case, an experienced surgeon can, at once, determine the propriety of cutting them away.

#### OF THE LOCOMOTIVE APPARATUS.

The locomotive apparatus, or the organs of motion, in man, are composed of two different systems of organs: 1st. THE BONES, OR OSSEOUS SYSTEM, with the *Ligaments*, which tie the different bones to each other, and assist in forming the joints. 2ndly, THE MUSCULAR SYSTEM, with the parts accessory to the muscles, called *Tendons*.

These organs are not all exclusively employed in moving the animal at will, from place to place, for many of them assist in producing internal motions, which are so necessary to life, that they are removed partly, or entirely, from the go-

vernment of the will. Besides those just enumerated, there are some other structures which aid in effecting or regulating these involuntary motions, and, yet, are not now generally acknowledged to be muscles, although they were formerly ranked as such. I shall speak of each of these systems separately.

#### OF THE BONES, OR OSSEOUS SYSTEM.

Among the very small and simple animals, whose movements are few and of but little extent, there is no skeleton; their muscles are simply attached to a hardened skin, or to each other, so as to draw different parts together; and by thus bending the body, to roll, push, or tumble it about. This arrangement we see in many marine and some land worms.

When we ascend a little in the scale, we come to animals of a more complex shape, and more various powers. They require some firmer support to the muscles, and then we see, either one or more solid external crusts serving, both for bones and a house, as in the shells; or we find the body and limbs enclosed in rings jointed together, so as to form a complete external skeleton, as in insects and crabs. But man could not exist, if constructed on either of these modes; his size, his energies, and his wants, all demand that his body and limbs should be moveable, and possessed of sensation in every part, and he is, therefore, endowed with internal bones.

When they first become perceptible in the infant, before birth, the bones are all soft and pulpy, being composed—like the rest of the body at a still earlier period—of simple cellular tissue, with its cells filled with a kind of glue: but most of them soon become converted, to all appearance, into cartilage, or gristle, by the deposition of another kind of harder matter along with the gluten in the cells. After a time, we find earthy matter or true bone, thrown down, at first irregularly, in different spots, within what is generally called the cartilage of each bone. These spots go on continually increasing, and the earthy matter at length becomes so considerable, in amount that the cartilage is no longer visible. The bone is then perfectly formed. This process is not completed in all parts of the skeleton until the child approaches to manhood, and happy indeed is the effect of this arrangement! for the long bones of young persons being partly cartilaginous, may yield to a certain extent without breaking, and before the fifth year, we not unfrequently see the limbs bent to a great extent without fracture. Children are so very liable to falls, that this yielding of the bones very often prevents more serious injury.

Even in the grown man, the cartilaginous part of bone is not entirely removed: only a part of it is taken up by the absorbents, in order to make room for the earthy matter, the particles of which are glued together by the remainder, to which gluing the parts owe all their strength. When a bone is soaked in a strong mineral acid, very nearly all the earthy portion is removed, for it is nothing but a salt of lime; yet the bone retains its shape, being then composed entirely of the remaining cartilage, and it may be bent in all directions without breaking. On the contrary, when the bone is heated for some time in a furnace, very nearly all the soft matter, namely, the cartilage and cellular tissue is burned out; yet it is not changed in form: the phosphate of lime preserves its shape, but the particles adhere so slightly, that they may be crumbled between the fingers.

Bone, then, or as it is called by anatomists, the osseous tissue, is composed of the fundamental cellular tissue with its cells distended, at first, with a glutinous fluid, afterwards with a substance resembling cartilage or gristle, to which it owes its elasticity, and at a still later period, a part of this last is removed and replaced by phosphate of lime, which gives it its characteristic hardness.

The precise mode in which the particles of the two different deposits just mentioned are arranged in the cellular tissue, is not precisely known; but we will now proceed to examine the structure of the bones, when fully formed, as they appear to the naked eye.

When you first look at one of the long bones, it seems to be formed of a great number of threads or fibres running side by side; but this appearance is deceptive: closer observation shows us that these seeming fibres are constantly running together and dividing in every direction, and that they are as irregular in size and length as in position. When a similar bone is broken by the hammer, particularly after it has been long exposed to the air or to fire, it scales off in such a manner as to induce the belief that it is composed of layers or strata placed one over another; but this is also deceptive, for more careful examination shows that these tables, as they have been termed by some anatomists, are completely united with the surrounding parts by bony matter, a little less condensed, and that they have no regularity of form, thickness, or direction.

The best mode of acquiring a tolerably clear idea of the structure of bone, is to pass a saw, lengthwise, through one of the principal long bones of some animal, while it is yet fresh. We find it composed of a cylinder of very hard materials, enlarging and becoming softer as it approaches the ends which



form the joints. Each of these long bones is originally composed of at least three pieces, the shaft and the two extremities, which do not fully unite until the animal approaches to its full growth. The extremities are composed of a thin outer crust, or covering, which resembles a membrane converted into bone; within, they consist of a great number of small cells and short fibres, as if formed of a portion of common cellular tissue rendered solid and hard in the same manner. The ends of the shafts resemble the extremities very closely; but as we carry our observations toward the middle part, we see the bony cells and fibres growing larger and fewer in number, and the external hard covering, thicker and stronger, until, in the centre of the shaft, we find a large cylinder, generally without any hard cells or divisions, enclosed in a bony case, which, at first sight, appears to contain no cavities within its substance. It seems as if the cellular tissue, which is loose and free in the extremities, were compressed and flattened down in the shaft by the growth of the cavity within, and the resistance of the membrane without, until the cells are nearly obliterated, and the whole mass converted into one solid bony fascia by the cartilaginous and earthy matter thrown down into it by the blood vessels. (Fig. 2.)

Fig. 2.



If we now saw one side of the shaft cross-wise, we shall find that the hard case, just described, is not perfectly solid, but that it contains many small and elongated cavities, which prove that the original cellular tissue is not destroyed: and the whole bone may be again reduced to that simple condition by the careful removal of the earthy and cartilaginous particles. The method of proving this fact, cannot be described, with propriety, in a popular work.

All the cavities, whether in the extremities, the central canal, or the hard covering of the shaft, are filled with a still more delicate portion of cellular tissue with its cells distended by a substance resembling a very soft fat, well known under the common name of *the marrow*.

The flat bones, such as those of the ribs, breast, &c., and the short bones, as those of the spine, &c., are formed in precisely the same manner with the extremities of the long bones. Those of the head, however, have been described by most anatomists as different in their arrange-



ment—this is a mistake; for the only peculiar circumstance observable in the growth of the bones of the head, is this; the cartilaginous and earthy matters of these bones are thrown down together, so that they are tolerably hard from the first, but the earthy particles are placed, and remain so widely parted until long after birth that these bones may be considerably bent, in children under a year old, without being completely broken. The necessity for this hardness of the bones of the head before birth will be plainly perceived, when we have considered the structure and uses of the skeleton.

The bones, thus organized, are provided with blood vessels, which are of course accompanied by nerves. They are therefore living organs; but, in a state of health, they have very little sensibility; when they are diseased, however, they are often the seat of excruciating pain.

The same remark will apply to the membrane containing the marrow. It is a common prejudice, that this marrow is exquisitely painful when touched, as in amputations; but, when healthy, it may be torn or cut almost without the injury being perceived by the patient for, in this respect, it does not differ from the general cellular tissue of which it is a portion.

The lower parts of the skeleton, such as the small, and most of the flat bones and the extremities of the long bones, are much more fully supplied with vessels and nerves, than the shafts of the long bones. For this reason, when inflammation attacks the former parts, it is apt to produce either an abscess or an ulcer, but when it affects the latter, the result is more frequently a mortification or absolute death of a part of the bone.

Each of the bones is covered externally by a very fine dense membrane, which is called the *periosteum*. It appears fibrous, and is not sensible to any great degree when free from disease. It supports and keeps in place the vessels and nerves which enter the bone, and if any considerable portion of it be torn off, the corresponding part of the bones is extremely apt to die for want of support, particularly if the injury takes place where the bone is thick and hard in structure. When inflamed, the periosteum may become the seat of intense pain, as those who have suffered with the worst form of felon will be willing to acknowledge.

In all the moveable joints, we see the extremities of the bones which form them covered with *cartilage*. The exact structure of the cartilages of the joints is not known; they seem to be composed of fibres set close together, side by side, and they run directly from the extremity of the bone toward the cavity of the joint. One of these cartilages covers the end of each bone, and when placed together, they form the hinge,

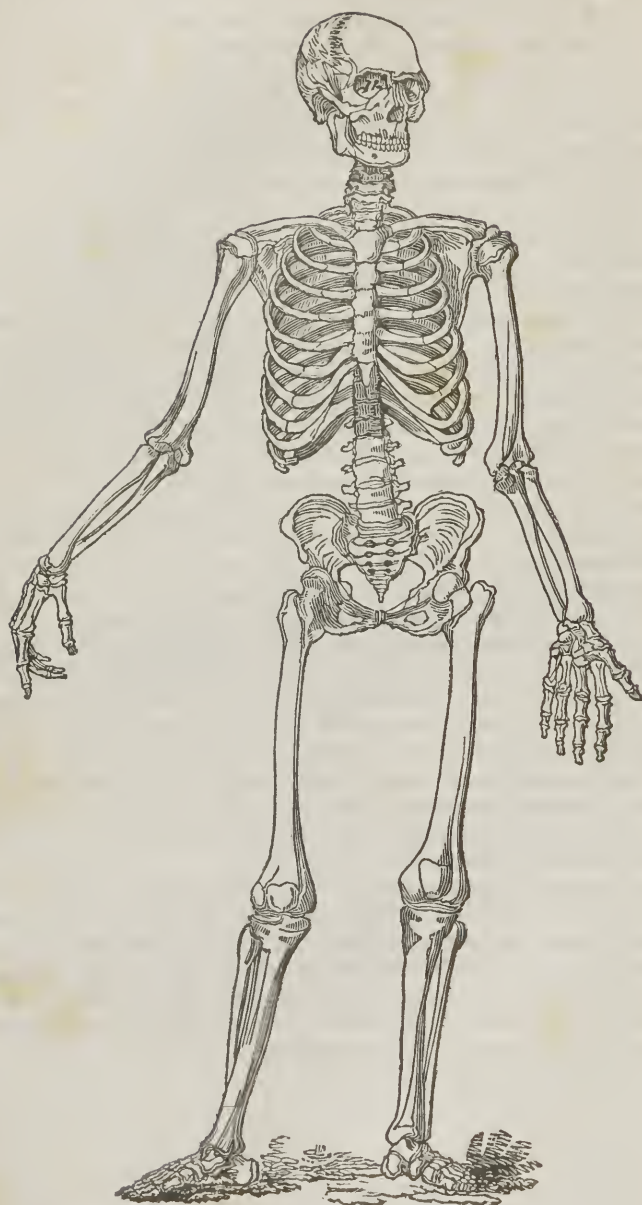
or ball and socket, which composes the joint. Their adjoining surfaces are among the smoothest in nature, and they are covered with an extremely delicate and polished membrane, which has been already alluded to when we were speaking of the serous cavities. This membrane contains the synovia, or oil of the joint. The articular cartilages are totally insensible, and their vital and diseased actions are as little known as their structure. Not so the synovial membrane, which, when injured and inflamed, becomes the seat of acute pain and serious disease.

The ligaments are strong, flexible, and generally inelastic bands, which bind together the different bones, and prevent the joints from exceeding the proper bounds of their motions. They are composed of cellular tissue very strongly condensed and strengthened by an interstitial deposit of a fibrous appearance. They differ very widely among themselves, both in form and in the arrangement of their fibres. When in health, they possess no very obvious sensibility; but when they are inflamed or rudely twisted, great pain results; as is seen in sprains of the ankle and other joints.

In white swellings and some other diseases of the joints, the ligaments become affected very seriously, and the principal reason why we do not more frequently find them diseased is, because they are so sparingly supplied with vessels and nerves—those most potent encouragers of vital energy. When they do become inflamed, the same sluggishness of the vital power renders their recovery slow and difficult; hence, the cause of the long continued soreness which follows severe sprains, particularly those of the loins from over lifting. When ligaments have once been stretched by any great force, they often continue permanently lengthened, and the patient may then become incurably lame. We see this result most frequently, in consequence of sprains of the ankle, and those of the internal ligament of the knee joint.

The parts thus noticed in a cursory manner, namely, the bones, the articular cartilages, and the ligaments of the joints, compose the skeleton, or frame work of the locomotive apparatus; they are the levers and pulleys of the human machine, and it is proper to take a glance at their general arrangement before we pass on to the description of the powers which act upon them, and put them in motion.

Fig. 3.



# OF THE SKELETON.

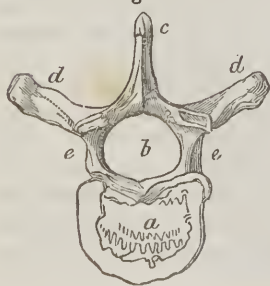
The skeleton is usually considered as divided into the bones of the *head*, those of the *trunk*, and those of the *extremities*. Of these parts, the trunk may be regarded as the basis, for we find it present in all animals, though many exist without either of the other divisions. The head stands next in importance, for it appears in many animals who are altogether deprived of extremities properly so called.

The bones of the trunk, in the adult man, are fifty-three in number. Of these, twenty-four are called *vertebræ*, and when taken collectively, form the spine or back bone.

The *Spine*, is a strong bony column extending along the back part of the trunk, from the lower part of the loins to the head. It is much thicker below, than at the summit, but its bulk varies in different places, in a manner not in strict accordance with any regular law. If viewed in front or rear, the spine appears perfectly straight when at rest; but if examined in profile, or laterally, it presents several strong curvatures,—sweeping considerably forward in the middle of the neck, and again in the loins, but projecting very much backward behind the chest. Each of the twenty-four bones which contribute to form the spine, except the uppermost, has a broad body, of a circular form, (a, fig. 4.) flattened above and below, where it approaches its neighbour. On the back part of this body we find a bridge of bone which extends from one side to the other, enclosing a small ring, (b,) through which the spinal marrow passes, and on the back and sides of this bridge, are several eminences of bone, (c, d,) mostly designed to give a proper attachment to the ligaments and muscles of the spine.

## A DORSAL VERTEBRA VIEWED PERPENDICULARLY.

Fig. 4.



- a, The flat side of the body of the bone, where it lies in contact with the next bone above.
- b, The ring or canal, through which the spinal marrow passes, surrounded by the bridge of bone which spans the back of the body of the vertebra.
- c, The spinous process which projects obliquely backwards and downwards, and forms one of the long line of bony knobs, which we feel, when the finger is passed down the back.
- d, d, Transverse processes.
- e, e, Articular processes.



One of these projections on each side above the bridge, and one on each side below, (*e, e,*) is designed to assist in forming the joint between each vertebra and its next neighbour, and these joints are differently arranged in different parts of the spine, so as to allow more motion in one place than in another.

As the head is obliged to move in all directions, a special arrangement is made of the joints between the two uppermost vertebræ and the cranium or bones of the head, properly so called, by which the latter have a pivot-like movement from side to side, so that the face may be turned to a considerable extent without the aid of the vertebræ of the neck, in general.

That portion of the spine which is found in the neck is likewise capable of considerable motion; for it may be bent backward and forward, or to either side, and it may also be twisted through a portion of a circle, so as greatly to assist in placing the head in any desired position. That portion of the column which lies behind the chest is composed of bones so closely jointed, and so fixed by their connexion with the ribs, and by many projections interlocking with each other, that it is almost immovable; but that part which supports the loins, though more fixed than the neck, may bend forward or to either side, or it may be rotated to a certain distance—as when we attempt to turn the head completely round without altering the position of the feet.

If the flat surfaces of the bodies of the vertebræ were in contact, the whole spine would be converted into a solid column of bone, and of course all motion would be rendered impossible. To prevent this difficulty nature has interposed between them a thick layer of a substance resembling cartilage, which is flexible and in a slight degree compressible. It is a very curious fact that the weight of the body during the day, while we remain erect, gradually presses these cartilages flatter; but in the night, while we are in bed, they slowly return to their original thickness. Now, as each of the twenty-four layers loses and gains its proper width during these diurnal changes, the sum of all these little expansions and contractions produces very obvious effect, and a tall man is found to measure considerably less in height at bed-time than he does in the morning. The cartilages just mentioned, give very great strength to the spine, while they permit the necessary motions of the body, to which each bone contributes its share. This is indeed a most wise arrangement; for if any one joint in the spine were endowed with the power of sudden or extensive motion, the spinal marrow would be liable to continual accidents, and life would be perpetually endangered; for it is a ge-

neral principle in mechanics that extensive movements produce feebleness and a greater liability to disorder.

Besides the cartilages just mentioned, there are many strong ligaments which surround the spine and add greatly to its strength. Among the most important of these, are those which extend from one bone to another, around the bridges at the back of the bodies of the vertebra, and which complete the canal through which passes the spinal marrow.

But the safety of this most important organ is not confided entirely to the bones, cartilages, and ligaments; for the numerous and powerful muscles of the back are so arranged as to give still greater firmness to the column which contains it.

The individual bones of the spine—of which seven belong to the neck, twelve to the back, and five to the loins—are almost entirely composed of soft cellular structure with no solid or ivory-like tables, so that the jar produced by a blow upon any part of them is not readily felt at a distance, as would be the case if they were more close in their texture. When we consider that, in addition to this, the whole spine and its accessory parts taken collectively, form a complete spring curved in different directions, and that each of the cartilages, separately considered, may be regarded as a springing cushion placed between neighbouring bones, we may form some idea of the care with which we are guarded against injuries by a beneficent Providence. Were it not for this arrangement, a very slight fall upon the feet would inevitably bruise or tear the brain or spinal marrow or produce a fracture of the basis of the skull.

The principal diseases of the spine are irritations, occasioning various nervous symptoms; *relaxations of the muscles and ligaments*, giving rise to curable deformity; and *ulceration or mortification of the vertebræ*, called *caries*, producing incurable changes of figure, and often death. These highly important affections will be fully noticed in the proper place.

*The Ribs*—Of these bones, little need be said, for every one is acquainted with their general appearance. They are twenty-four in number, twelve on each side. They are each attached to the vertebræ behind, in two places; first, by the extreme ends, called the heads of the ribs, which form joints with the bodies of those bones, and secondly, by little prominences, somewhat farther forward, which are connected by ligaments with bony projections from the sides of the posterior bridges that enclose the spinal marrow.

The seven uppermost pairs of ribs, thus firmly fixed behind, are connected with the breast bone in front, by means of long cartilages (so called) very closely resembling the ribs in shape, and differing from them only in the deficiency of earthy matter: they are in fact proper bones, which do not ossify com-

pletely, but remain in a condition very similar to some parts of the extremities in very young children. When broken, they generally unite by throwing out bony matter, and in old age, some of them often become completely ossified. They form regular moveable joints with the breast bone. The remaining pairs of ribs are called false ribs, because they are not directly connected with the breast bone. The cartilages of all but the two last pairs generally run together, or are connected to each other in a somewhat irregular manner, and are finally joined to that of the seventh or last true rib before it reaches the sternum. The two last pairs are merely tipped with a portion of cartilage which is not connected with any other.

The upper pairs of ribs pass in a direction pretty nearly horizontal, but each succeeding couple becomes more and more oblique as we descend. They are all bound together by muscles which pass from the edges of each rib, to the opposite margin of its neighbours above and below, so that if one pair be raised, the others must follow its movements. They act like a series of hoops of different lengths tied together by cords; but as the lower pairs with their cartilages are much longer and more oblique, than the upper ones, and as they are fastened at nearly equal distances from each other both before and behind, it follows that when moved, they must sweep in larger circles, and thus the lower part of the chest is dilated and contracted to a much greater extent than the upper part during the act of breathing. The seven superior pairs of ribs embrace the chief part of the heart, lungs, and other important organs, and the five inferior pairs give an attachment to the circular edge of a large thin muscle called the *diaphragm* or *midriff*, which divides the cavity of the belly from that of the chest. It will be described more particularly when we speak of the function of respiration.

The use of the ribs is to protect the organs within the chest, and to assist in drawing in, and expelling the air in breathing. They are composed of loose cellular bone covered by a firm but thin external coat of harder matter. Their diseases do not differ from those of the bones in general.

*The Breast Bone or Sternum*, is formed of three pieces joined together by strong ligaments, but in old age they are frequently found united into one. For all practical purposes in the present treatise, these pieces may be regarded as a single bone somewhat triangular in form, reaching from the throat to the pit of the stomach. It is about two or two and a half inches wide at the top, and tapers to a blunted point at the bottom. Its sides are extremely irregular, being festooned by the jutting out of the surfaces with which the cartilages of the

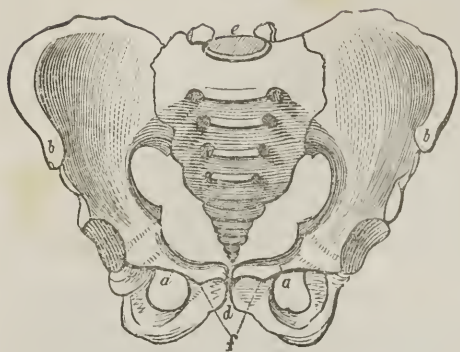
ribs are articulated. This bone is of cellular structure, and not unfrequently a portion of it near the centre remains unossified or cartilaginous, so that a dirk or small sword may penetrate it with ease. The lower extremity seldom becomes bony during childhood, and it sometimes remains cartilaginous till late in life. The soft texture and position of this bone, resting as it does on the cartilages of the ribs, as if upon springs, enable it to furnish effectual protection to the lungs and heart, against the effect of falls and blows. It is very rarely fractured. The two uppermost angles, receive the inner ends of the collar bones which are there furnished with moveable joints.

Abscesses within the chest have been known to make their way to the surface through the breast bone, and aneurisms have sometimes occasioned the absorption of a part of it as they do of the ribs. Its other diseases resemble those of the bones in general.

*The Basin or Pelvis* is formed in infancy of a considerable number of separate bones; but in middle age, these become united together so as to reduce the number to four. The first of these is a large, light spongy bone of a triangular or pyramidal shape, very broad and thick at its upper part, and tapering nearly to a point below. It is concave in front, and convex behind, and is regarded as a continuation of the spine. This bone is called *the Sacrum*; and is composed, in infancy, of five parts, each of which resembles a separate vertebra. Attached to the lower end of the sacrum, there is another small bone, which is composed of four pieces during childhood, and it may be considered as the rudiment of a tail, much as such an acknowledgment may mortify the pride of humanity. In the adult male, the two bones just mentioned sometimes become united into one, which may give rise to considerable inconvenience, as the latter is then subject to the danger of fracture, a very serious accident in this situation. In the female, this union rarely occurs till late in life, and may occasion great difficulty in delivery when the junction takes place too early. The lower bone is called the *Os Coccygis*, and has a moveable articulation with the sacrum.



Fig. 5. The Pelvis.



The remainder of the basin is formed by the share bones, which are so irregular in shape, that it would be improper to attempt to describe them in this work. A glance at the accompanying figure will convey a better idea of their form, than could be communicated by many pages of description.

In infancy, these bones are each formed of three separate parts which grow together before manhood arrives. It may be well simply to name them here, without expecting the reader to remember them, because, if he should ever have occasion to refer to other works of a somewhat less popular character, he will often find their names employed as if the original divisions still existed. The front part of the share bone, which extends downward between the bottom of the belly and the groin, is called *the Pubis*; the lower part, which supports the body when we are sitting down, is *the Ischium*; and the lateral broad portion with the wings extended upward, is *the Ilium*.

The upper part of the sacrum projects forwards, and there is a strong ridge or contraction, which encircles the middle of the share bones, which, together with this projection, forms what is called the brim of the pelvis. Above this brim, the share bones are extended into two large wings which are spread outward and upward to a considerable distance, and may be plainly felt by placing the hand above the hip. These bony wings form a part of the sides of the belly, and give a firm attachment to many of its muscles.

Below the brim, the sacrum and lower part of the share-bones form the greater part of the sides of a large cavity, which, when completed by the muscles and other soft parts, that fill the intervals between the bones, is called the cavity of the pelvis. It contains the bladder and the last intestine, together with all the parts peculiar to the female. Just below the brim of the pelvis and nearly opposite the middle of the share-bone on the outer side, we find a large and deep cup-like cavity in which is received the head of the thigh bone where it forms the hip joint.

Having now described all the bones of the trunk, namely, the twenty-four vertebræ, the twenty-four ribs, the breast bone, and the four bones of the basin, we here leave the trunk and pass on to the next great division of the body, the head.

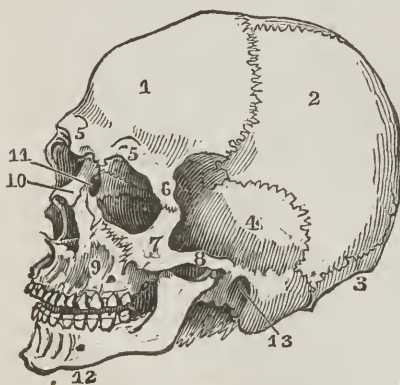
### THE HEAD.

The bones of the head are divided into those of *the cranium* and those of *the face*; the former enclosing the cavity for the reception of the brain, the latter furnishing support to the features, and to the organs of three of the senses—sight, smell, and taste; those of hearing being located in one of the bones of the cranium.

*The cranium* is composed of six bones, which are properly its own, and there are two others common to it and to the face.

The six bones proper to the cranium are for the most part thin, not exceeding one-fourth of an inch in thickness in most persons and places, (fig. 7, <sup>1</sup>) and in some situations the light may be distinctly seen through them, when held opposite, to a candle. They surround the whole cavity for the brains except a small portion of the floor of that cavity, immediately over the nose and the upper part of the throat, which is formed by the two bones common to the cranium and face. The parts of the several bones which form the floor of the cavity are generally much thicker than those which form its sides, back, and roof; but the partitions between the orbits of the eyes and the brain, and those also which cover the nose are extremely thin and delicate.

Fig. 6.



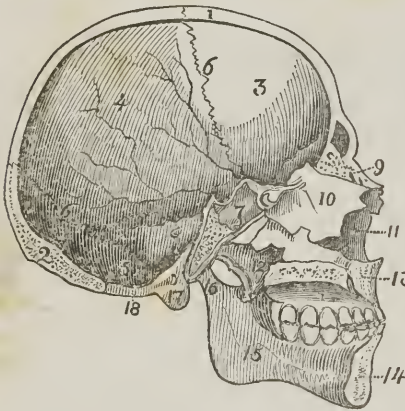
These bones are formed within and without of very firm hard tables, separated from each other by a layer of soft cellular structure. The inner table resembles ivory in closeness, but the outer is more like the middle portions of the long bones in density. In some places, these tables are widely parted, and the intervening cellular matter is

wanting, so that cavities are formed within the skull, (fig. 7, <sup>7</sup>) but they are unlike those of the long bones, for they contain nothing but air. All these cavities communicate either with the nose or throat, and are not developed until the individual approaches

the age of puberty. They are designed, like the barrel of an organ, to deepen the tone of the voice. One of the most remarkable of these cavities is formed behind the inner end of the eyebrow; it is familiar to farmers as the part which lodges the worm in sheep; and cases of the same nature have been known to occur in man, (fig. 6, <sup>5</sup>, <sup>5</sup>.) When a severe blow is received over the eyebrow, it is not unusual to see the outer table of the skull broken or crushed into the cavity just mentioned, without any injury of the inner table or to the brain which it covers.

The cavity of the cranium resembles an egg in shape, the small end presenting toward the forehead, but over the eyes and nose there is a considerable variation from this shape, as if the egg had been broken and somewhat dented inward at that part. Some idea of the dimensions of this cavity may be formed by supposing the head to be divided by a plane passing from the eyebrows through the tubes of both ears to the point of junction between the head and neck behind. All that lays above this plane is the cranium proper, and after deducting the thickness of the bones and soft parts which cover it the remainder is the cavity. It is completely filled with the brain.

Fig. 7.



LONGITUDINAL SECTION OF THE HEAD.

openings of the head, where we feel no bone in young children, but where the finger perceives the pulsations of the brain through the skin, are in reality portions of the cranium in this primitive or soft state.

This deficient ossification prevents the different bones of the child's head from coming into absolute contact, and the thinness of the edges permits them sometimes actually to slide over each other so as to diminish the size and change the shape of the head, in very difficult labours, without injury to the

The bones of the cranium in infancy are remarkably thin and delicate. They are imperfectly ossified, and the edges and corners remain for a time in a mucilaginous state, being composed of delicate cellular tissue well supplied with blood vessels, and filling up the space between the internal and external periosteum or membrane which covers the bones. The parts called by mothers the

brain. This important provision of nature preserves the existence of thousands at the very onset of life.

When young children are attacked by dropsy of the brain, these bones, being connected only by soft parts, are stretched asunder by the pressure of the fluid within, and in this way the head becomes enormously enlarged, yet the patient may live; whereas if the same disease should exist to any considerable extent after the bones become firmly united, death, from compression of the brain would inevitably follow.

Even the ossified parts of the young head, although they are never entirely cartilaginous like some other parts of the skeleton, do not contain a very large amount of earthy matter. They continue to be, in some degree, flexible for a few months after birth. This condition of the parts protects the brain from being wounded by many of the unavoidable accidents of childhood; for these soft bones often yield, where, if they were harder, they would break. Even when actually broken, for this sometimes happens, the pieces do not form sharp edges and points as they do at a later period in life, but they rather tear like stiff paper; and even when driven inward, so as to form a star-like depression, the fragments generally preserve some connexion with the rest of the bone: in such cases the brain is pushed before the depressed portions, but the other bones and the softer parts of the head make room for it by allowing themselves to be swelled outward. After a time the pulsations of the brain often succeed in pushing the pieces into their proper place, and little trace of the injury remains. I have seen a case of fractured skull in delivery produced by a deformity in the mother, and several others in children under the age of one year, in which scarcely any unpleasant consequences followed.

As the child grows older the bones of the head grow thicker and stronger until they enclose the whole cavity of the cranium, being dove-tailed into each other along all their edges in a manner which renders their joinings as strong as their other parts. This kind of articulation is called a suture, (fig. 7, <sup>6</sup>, <sup>6</sup>,) and a single glance at a skull will enable the reader to perceive how beautifully it is adapted to produce uncommon strength.

The cranium, when fully formed, is a long case, arched and rounded in every direction, so as to oppose the greatest possible resistance to blows and other injuries, with the least possible expense of material. In those places where it is most exposed to accident, as at the back, and the most prominent parts of the sides of the head and forehead, it is thicker, and there is more of the cellular structure interposed between its tables, (fig. 7, <sup>2</sup>.) On the contrary, where the surface retreats a little, or where it is protected by thick muscles, as on the temples, it is very



thin, and the two tables are almost in contact. Directly over the eye there is a smooth plate of bone which covers the orbit and forms part of the floor of the cranium on which the brain reposes. This plate is as thin as writing paper, and so weak that a thrust with a small sword in the eye is considered inevitably fatal, as the weapon penetrates it and enters the brain with the utmost facility. There is a still more delicate division between the upper part of the nose and the brain, and the bone is in this place rendered additionally weak by the great number of little holes which pass through it to give passage to the branches of the nerves of smell. The back part of the external bones of the nose lie in contact with this very tender plate, and hence a hard blow on the root of the nose has been known to produce death by causing a fracture there, and a consequent injury to the brain; an accident which would be much more frequent were it not for the protection given to the part by the solid overhanging ridge of the eyebrows. The internal organ of hearing, on the contrary, is enclosed in a portion of bone extremely hard and thick, which forms the middle of the floor of the cranium, and the greater part of this floor is formed of portions of bone of a very irregular shape and thickness, of a more cellular texture, and penetrated with numerous holes for the passage of many nerves, the exit of the veins, and the entrance of the arteries of the head. A little behind the middle of the floor, we find a very large round hole, about an inch in diameter, (fig. 7, <sup>18</sup>,) through which the spinal marrow passes from the vertebral canal, already described, into the head, to be connected with the brain. At the sides of this hole we find the two articular prominences by which the head is supported on the first bone of the spine.

Before leaving the head it will be proper to mention the name and position of the six bones proper to the cranium, as they are frequently met with in popular works.

The first or *frontal bone*, (fig. 6, <sup>1</sup>, and 7, <sup>3</sup>,) forms the whole forehead, and extends an inch or two above the commencement of the hair. It also furnishes the two thin plates which extend backwards from the brow and cover the orbit of the eye.

The *two parietal bones* (fig. 6, <sup>2</sup>, and 7, <sup>4</sup>,) are nearly rectangular, and extend on each side of the middle line of the head, from the back part of the frontal bone to the vertex or crown of the head, and from the middle line just mentioned to about the top of the ear. The centres of these bones are clearly marked by the strong swelling or protuberance usually observed at the back part of the side of the head.

The *two temporal bones* (fig. 6, <sup>4</sup>,) are found, one on each side of the head, at its lower part. They have each a broad, thin, wing-like expansion which forms the greater part of the temple, and

a long, narrow process which is so joined to the cheek-bone as to form a bridge, elevated three-fourths of an inch above the general surface of the skull, which covers and keeps in place one of the principal muscles designed to close the lower upon the upper jaw, (fig. 6, <sup>8</sup>.) They also contain the external opening of the ears, and provide that solid mass of bone which forms the middle portion of the floor of the cranium, and encloses the internal parts of the ear. Those pap-like eminences (fig. 7, <sup>17</sup>), which we feel immediately behind the ears are portions of these bones; they are hollow within, and its cavity communicates with the cavity of the drum of the ear, and also with the throat by means of long fleshy tubes, which are sometimes closed by inflammation, producing a species of deafness.

*The occipital bone, or occiput*, forms the back part of the head behind the crown, and a very considerable part of the floor of the cranium, (fig. 6, <sup>3</sup>, and 7, <sup>5</sup>.) It is in this bone that we find the large hole for the passage of the spinal marrow, and the joints which connect the head with the spine. This portion of the occiput is thicker, softer, and more spongy, to assist in protecting the brain from the jar which follows a fall from a height upon the feet. The whole mechanism of the cranium displays a wonderful combination of strength and lightness, and is admirably adapted for the preservation of the all-important organs which it encloses.

Of the two bones common to the head and face I need not speak, as in this very hasty anatomical sketch I propose to dwell only upon such points as are useful to the general reader, avoiding whatever is only intelligible to adepts in medicine. They form the middle and part of the front portion of the floor of the cranium.

The face is composed of thirteen different bones, but it is altogether foreign to our purpose to describe them here. A few remarks on some of those bones will be found in the articles on the diseases and accidents to which they are liable.

### THE EXTREMITIES.

The superior extremities are each composed of thirty-one bones, the two first of which are the collar bone and shoulder blade.

*The collar bone* is long and slender, but it is made of very firm materials, and is almost completely ossified at birth. It is about as thick as the fore finger, and somewhat resembles the letter S in form. It is connected by regular moveable joints, with the breast-bone at its inner extremity, and with the shoulder blade at its outer end. It may be plainly felt

throughout its whole length, as it forms a salient ridge between the bottom of the neck and the top of the chest. Its principal uses are to keep the shoulder joint at a sufficient distance from the side of the body to facilitate the motions of the arm, and to protect the nerves and blood vessels on the front of the neck from blows and other accidents.

*The shoulder blade* is a broad, flat, thin bone, of a triangular shape, which covers a considerable part of the back and side of the chest. Its hinder edge is easily felt, extending near the spine, from the bottom of the neck to near the middle of the back; its upper edge, which is deeply buried, runs in a horizontal direction along the bottom of the neck to the shoulder joint; and its third edge passes obliquely from this joint to the lowest point of the first.

Along the back of this bone, not far below the top, the finger perceives a long and very strong ridge which runs from the hinder edge forward, and a little upward to the shoulder joint. This ridge or spine becomes very wide and strong at its outer extremity, where it hangs over the joint and forms the point of the shoulder. At a short distance below this point we find the outer corner of the shoulder blade, and upon it the shallow cup-like cavity that receives the round head of the bone of the arm, with which bone it forms the shoulder joint. The only firm connexion between the bones of the superior extremities and those of the trunk is through the medium of the collar bone, upon which the shoulder blade appears suspended, if we may be allowed the expression, by the extremity of its spine.

The shoulder blade is every where surrounded, lapped up, and supported by numerous very large muscles, coming from the head, the spine, the ribs, the sternum, or from its own edges and spine; and these muscles have the power of pulling it in every direction, so as to produce the various motions of which the shoulder joint is capable while the arm hangs inactive.

Our remarks upon the bones of the extremities must be necessarily very brief, and I shall therefore confine my attention to a few points of paramount importance, as all details on this subject are connected rather with the practice of surgery than with that of medicine, and are therefore less interesting to the class of readers for whom this work is designed.

*The bone of the arm* extends from the shoulder joint to that of the elbow. Its shaft or body is nearly cylindrical, but it becomes considerably larger at its upper extremity where we find a hemispherical eminence on the side next the body, which is covered with an extremely smooth cartilage. The face of this eminence looks inward and upward; it is received

into the shallow cup, already described as terminating the outer angle of the shoulder blade: thus a regular ball and socket articulation is formed, which permits the arm to be moved to a great extent and in every direction.

From the shallowness of this joint, the shoulder is very liable to be dislocated, but the projection of the ridge or spine of the shoulder blade prevents the head of the bone from being pressed upward, and it is almost always displaced in the downward direction.

The lower end of the bone of the arm is very much widened laterally, and flattened before and behind. It terminates in a rounded scroll or cylinder that looks as if it were a separate piece set crosswise upon the bone. The surface of this scroll is coated with smooth cartilages, and is divided by an elevated ridge which passes round it, causing it to resemble the surface of two pulleys united together. Upon the cartilage covering this scroll the two bones of the forearm work, and the elbow joint thus formed has a perfectly hinge-like character, its only motions being forward and backward.

*The Ulna* is the bone of the forearm chiefly concerned in forming the elbow joint. It grasps the scroll-like extremity of the bone of the arm, much in the manner that the hand grasps a large roll of paper, the part corresponding with the palm and fingers being on the hinder side. The ulna does not stop exactly at the joint, but projects a little above it behind, so that when the forearm is fully extended this projection comes in contact with the bone of the arm and prevents the former from bending farther back; it has also a slight elevation on the front side of the ulna, which is partly intended to check in the same manner the too great flexion of the forearm.

The ulna gradually tapers from the elbow to the wrist, where it becomes very slender, and is coated with cartilage so as to form a very small part of the wrist joint. It lies along the inside of the forearm, and terminates at the side of the wrist next the little finger. Its broad connexion with the elbow joint keeps it so fixed that it cannot turn, and it has only a hinge-like motion at that joint.

*The Radius* is the second bone of the forearm, and is chiefly concerned in forming the wrist joint. Its upper extremity is very slender, and is capped by a tolerably thick ring or wheel of bone much wider than the body of the radius at this place. The upper side of the ring is a little hollowed, and fits on to the outer part of the scroll-like extremity of the bone of the arm in such a manner that it enjoys not only the hinge-like motion in common with the ulna, but also a rotatory motion on its own axis. Not only the upper surface but the edge



also of this ring is covered with cartilage, and the edge is received into a smooth notch in the side of the ulna, against which it is confined by ligaments, forming a joint which does not interfere with its rotatory movements.

At its lower extremity the radius becomes very much enlarged, more especially in breadth, and terminates in a wide and slightly concave surface coated with cartilage, which, with some little assistance from the ulna, forms the upper surface of the wrist joint. On the inner side of this lower extremity of the radius there is a semi-lunar notch which plays over the side of the small rounded end of the ulna, both these parts being covered with cartilage and secured by ligaments. This arrangement, together with that of the joint already described between the upper ends of the same bones, permits the radius to revolve round the lower part of the ulna, carrying the hand with it, so as to present the palm upward or downward at will.

*The Wrist* is composed of eight bones, connected together by joints so various and complex as almost to baffle description. They occupy the space between what is called the wrist joint and the line at which the wristband of a well made shirt terminates upon the hand. Their movements upon each, though slight and almost imperceptible, are all-important in character, and contribute in a great degree to the perfection of that instrument to the possession of which philosophers attribute much of the superiority of man over the inferior creation, the master-piece of animal mechanics, the human hand! It would be altogether in vain here to attempt an explanation of movements which even professed anatomists who comprehend them, would find it impossible to describe.

Taken collectively, and considered as if they were but one, the bones of the wrist form a rounded somewhat circular sweep at their upper edge which is covered with cartilage, and fits into the cavity formed by the lower extremities of the two bones of the forearm. The joint thus formed permits the hand to be bent to a considerable extent backwards, forwards, and inward or toward the little finger, but only very slightly outward or toward the thumb. The lower edge of the bones of the wrist is very irregular to accommodate the articulations of the five long slender bones which support the fingers and thumb, and which are plainly felt in the substance of the hand. The wrist is strongly arched on the back, and still more strongly concave toward the palm, which circumstances render it admirably adapted for grasping and holding rounded bodies.

*The long bones that support the fingers and thumb* enjoy no great extent of motion; but that which they do possess is

of incalculable value. Those of the fore and middle finger are nearly fixed, but that of the thumb enables us to oppose it to the palm,—a power of such importance that a stiffness of the upper joint of this bone destroys perhaps four-fifths of the usefulness of the hand, and as the bones corresponding to the ring, and more especially the little finger, contribute greatly to this opposition, the loss of their motions should be considered a much more serious disaster than the entire destruction of the middle finger, with its supporter.

*The bones proper to the fingers und thumb*, being fourteen in number, are so completely subject to observation that it is unnecessary to speak of their form and motions. There are a few other small bones varying in number in different individuals, which are commonly ranked among the bones of the hand, but they are rather appendages to the muscular system than to the skeleton, and we shall not notice them.

The Inferior Extremities are formed on the same general model with the Superior, and it will be sufficient for our purpose to notice the principal points of difference without repeating the description of each particular bone.

*The Hip Joint.* There is nothing corresponding to the collar bone or shoulder blade in the inferior extremities.

The very deep cup-like cavity for the hip joint, situated near the middle of each of the share-bones, has been already mentioned. Now the head of the thigh-bone which fills that cavity forms a much larger portion of a sphere than the corresponding part of the bone of the arm, and it is much more deeply and firmly embraced in the joint, like the ball in the socket attached to a surveyor's compass; its motions are therefore much more limited; it is more difficult to dislocate it, and also to replace it when once thrown out. It is secured not only by a strong capsular ligament, but is likewise furnished with a very powerful cord-like ligament passing from the middle of the ball to the bottom of the socket; the latter must be broken or detached, and the former is almost always torn before it can be put out of place.

The head of the thigh-bone is not situated directly on the shaft as is that of the bone of the arm, but stands on the end of a neck of considerable length, running from the side of the shaft upward and inward to the joint. In old age this neck becomes shorter and softer, and bends downward till at length it stands nearly at right angles to the shaft of the bone; hence it is very seldom broken in persons under fifty years of age, but much more frequently in very old people. This change is one of the causes of the diminution of stature in advanced life.

*The Knee Joint* differs from the elbow in being formed by

two long bones instead of three. The scroll at the lower extremity of the thigh-bone is indented round the middle by a very deep groove, and seems almost divided into two heads. Each of these apparent heads rests on a shallow depression upon the upper flat surface of the tibia—the bone which forms the shin. This latter is very large and stout; it is swelled out at its upper end until it becomes as wide as the whole knee joint, and thus gives ample support to the body. It has no bony projections, like those of the ulna, to check the too great flexion or extension of the leg, and this deficiency is chiefly remedied by two strong ligaments crossing each other within the joint, one or other of which is put upon the stretch when the leg is straightened or bent to its utmost extent.

Besides these and the capsular ligament, the knee has very strong lateral ligaments—particularly on the inside—for the obliquity of the thigh and the straightness of the leg produce a strong tendency in the knee to bend inward under the weight of the body. In heavy lifting, or in violent jumping, the inner lateral ligament is sometimes stretched or elongated, and almost incurable lameness results.

There is yet another small round bone connected with the knee joint, which has no parallel in the superior extremity. This is the *Patella, or cap of the knee*. It is enveloped in the tendon of the muscles that extend the leg. This tendon passes over, and around it, to be attached to the shin bone, just below the joint. The patella is smooth and covered with cartilage on its inside, where it is fitted to the groove or pulley of the thigh bone, over which it plays. It protects the front of the joint, and acting like a pulley, enables the muscles connected with it to act at a considerable mechanical advantage. It may be dislocated in dancing or leaping, but may be generally pushed back without much difficulty. It is sometimes broken by similar exertions, or by blows, a most unfortunate accident, for the muscles immediately draw the upper fragment away from the lower one; they can then be kept in contact only by extreme care and skill, and unsuccessful treatment is followed by incurable lameness. In this particular, the patella resembles the projection of the ulna behind the elbow, which is liable to similar disasters.

*The Tibia, or Shin Bone*, is very thick, and shaped like a triangular prism. Its upper and larger end forms all the lower surface of the knee joint and its lower extremity forms nearly the whole of the ankle joint. It has no rotatory motion.

*The Fibula or lesser bone of the leg*, is also somewhat triangular, but it is very slender and delicate. It is articulated above with the outside of the bulging extremity of the last bone, and below with the side of its lower extremity, by two

small, nearly flat surfaces. It projects somewhat beyond the lower end of the tibia, and one side of the projection contributes to the ankle joint, while the other forms what is commonly called the outer ankle. It has almost no power of motion.

*The Ankle Joint.* That bone of the instep which is interested in the joint has, on its upper surface, an eminence like the half of a solid cylinder set crosswise with regard to the foot, and this is received into a corresponding depression in the bottom of the tibia—thus forming a hinge-like articulation. To strengthen this hinge, the inner part of the tibia sends down a process which faces the corresponding end of the cylinder, and forms the inner ankle, while the fibula, extended as already described, faces the outer end, and forms the outer ankle. The process of the articular bone of the instep, just mentioned, does not entirely fill the cavity thus formed by the two bones of the leg, so that the foot not only enjoys the plain hinge-like motion, but it may also perform some little rotation, and the sole may be turned considerably inward, or somewhat outward. The former of these motions is increased by a very slight mobility of the fibula, and the latter, by a more complex change of position among the several bones of the instep. To facilitate these various actions, the ligaments of the ankle joint are longer or more relaxed than most others; the stability of our footing depends mainly on the balance of power among the various muscles of the leg, and calls for the co-operation of consciousness and the will; hence, sprains of the ankle occur very frequently to heedless walkers. By long practice, the ligaments of the ankle joint may be stretched so as to allow the foot to assume attitudes altogether unnatural, and it is consequently rendered much more liable to injury. The votaries of Terpsicore are not aware that they owe much of their pretended grace to an absolute deformity.

*The bones of the Instep,* are seven in number, they form, together with the long bones supporting the toes, a very strong arch admirably adapted to sustain the weight of the body, which rests chiefly on the heel and the ball of the great toe. In raising the body on the toes, very great force is required, and in order that the muscles which effect this motion, may act at a considerable mechanical advantage, the bone of the heel is lengthened out, to some distance beyond the ankle joint, and the tendon of those muscles is inserted into its very extremity.

The toes possess no power of antagonizing each other like the thumb, fingers and palm—hence, their uses and applications are few and simple, but like the different parts of the hand, they vary greatly in importance. The ball of the great toe, as it supports a large share of the weight of the body,



stands decidedly at the head of the list: when the toes are extensively crushed, so long as this part is preserved, the injury is considered comparatively slight.

I have now noticed all the parts proper to the skeleton, but there remains one very curious bone, shaped somewhat like a new moon; it is small and delicate, and is composed of a body, two short, and two long horns, the last being generally attached to the first by small portions of bone in the cartilaginous state, which permit some degree of motion. This bone is found at the root of the tongue, following the motions of that organ, and it hangs chiefly suspended on certain muscles of the tongue, the lower jaw, and throat. It is only connected with the skeleton by means of a few long and very slender ligaments.

There are also four minute bones connected each with the ear, but these will be noticed when we consider the sense of hearing.

The reader has now before him, such a general view of the structure and mechanical arrangement of the healthy skeleton as our narrow limits will allow. I will, therefore, elose this review of the osseous system with a few remarks upon the changes produced in it by age and disease.

In old age the cartilaginous layers between the different bones of the spine become thicker and harder, so that the length of the column is considerably diminished, and as this change takes place more rapidly before than behind, the bodies of the vertebræ tilt forward, and produce the characteristic stoop and the rounded back of age. Both these causes tend not only to lessen the stature of the individual, but likewise to limit the extent and facility of motion in the back.

The ribs are for the same reason approximated toward each other, and some of their cartilages become partly or entirely ossified. This prevents them from moving with their original freedom, and necessarily embarrasses the function of respiration, thus assisting in rendering the action of the heart and arteries slow and sluggish in a manner that will be more particularly noticed hereafter.

The harder parts of all the bones become still more firm with age, in consequence of the continual deposition of earthy matter within their substance, by which their cells are filled up, and the quantity of their cartilaginous and cellular structure is proportionably diminished. The number of their blood vessels is lessened, and they sometimes become brittle for want of sufficient animal matter to glue the earthy particles firmly together. The softer parts, on the contrary, such as the ends of the long, and the bodies of the short bones, with the cellular structure between the two tables of the skull, be-

come still softer with age, and yield more or less to the effect of continued pressure, so as to contribute in no small degree to the diminution in stature. These changes will at once explain the frequent occurrence and difficult cure of fracture in advanced life.

The diseases of the osseous system may affect the whole skeleton, or only certain particular bones or their several parts.

The most remarkable of those of the former class are, first, the brittleness of bone, (*fragilitas ossium*), which arises from a deficiency of the animal or cartilaginous matter, and occasions fractures from the slightest cause, such as throwing a stone, stepping from a high side walk, &c.; secondly, softness of bone, (*mollities osseum*) caused by an absorption of the earthy matter, even of the most solid parts, permitting the bones to bend and twist by the action of the muscles, until in some cases, the miserable sufferer loses almost all resemblance to humanity. Thirdly, the rickets—a disease somewhat resembling the last, but occurring chiefly in children, from a deficient secretion of earthy matter. The two first mentioned diseases are almost unknown in this country; the last is also rare, but it will be noticed in the proper place.

There are many diseases generally called constitutional, which may affect the osseous system to a greater or less extent, without involving the whole skeleton like those mentioned above. Thus scrofula not only produces those affections of the joints, cartilages and ligaments, which are commonly confused under the general head of white swellings, but it sometimes attacks even the shafts of the long bones, causing them to become swelled, softened, and converted into a mass of loose bony net work, filled with a matter like diseased marrow. It seems as if the cartilaginous portion was diminished, its place being supplied by a glutinous and an oily matter, and the cells of the bone dilated to a great extent. As the patient recovers, the bone returns nearly to its original state. True cancer when it exists for a long time in the immediate neighbourhood of a bone, causes various changes in its structure; its looser parts are softened, and in the long bones, the medullary cavity is enlarged without any change in the external shape of the bone, whilst the hard crust becomes so thin as sometimes to break with the mere effort to turn in bed, and the periosteum peals off with the greatest facility, in consequence of the obliteration of its blood vessels. Soft cancer, (*fungus hæmatodes*), on the contrary, converts the substance of bone into its own peculiar structure, with a rapidity truly astonishing—paying no respect to its firmest parts, but involving every thing which it touches in one common tumour. The venereal disease does not very commonly

affect the bone itself, except in a secondary manner by injuring the periosteum from which it derives its support. Its most common effect upon this membrane is the production of tumours called nodes, which are found in all conditions from a simple swelling to a regular ossification of the membrane. The irritation thus commenced in the periosteum may be continued to the solid substance of the bone, so as to produce all the various phenomena of inflammation of that tissue—or it may so embarrass the circulation in the blood vessels of the membrane, as to cause the death of that part of the bone lying immediately beneath it.

As most of the diseases just mentioned are very rare, some of them absolutely incurable, and the remainder very difficult to treat, they do not fall within the intention of this work, and are merely noticed here in order to give the reader an idea of the highly vital character of parts commonly considered as mere inanimate levers formed of earthy matter and produced and repaired by the surrounding parts.

The more strictly local diseases of bone result from irritations or inflammations within their substance, and the most important of them will be noticed hereafter, when the reader is better prepared to comprehend their nature.

#### OF THE MUSCLES OR MUSCULAR SYSTEM.

The muscles are the organs by means of which are accomplished all the various perceptible motions going on in the living body, whether they are performed voluntarily like those of the feet in walking, or involuntarily, like those of the bowels in digestion.

When one of the more perfect animals, such as an ox, a sheep, or a fowl is killed and divided, we find the great mass of the body, with the exception of the brain, bowels, bones, and skin, chiefly composed of two kinds of matter. The first is white or colourless, containing here and there masses of fat, and covers and fills up most of the cavities or intervals between the other parts, giving a roundness and finish to the form. This is the cellular tissue already described. The other kind of matter is red, apparently fibrous, and much less yielding. This is commonly called the flesh. It is entirely composed of muscles—so that the terms *flesh*, in general language, and *muscle*, in works on anatomy, are nearly synonymous.

If we pass our knife through a joint of meat in certain directions, we find that we produce a very rough and irregular surface, even when we follow the direction of the grain; but the practised carver, in carving a pig, or poultry, soon learns

to cut in such a manner as to leave the surface of the different pieces smooth and regular. This is accomplished by following the course of the natural boundaries between the different muscles so as to divide nothing but the intervening layers of cellular tissue, without disturbing the muscular fibres. Now a little care in discovering and pursuing these boundaries will convince the curious that what we generally take for a uniform mass of flesh is really a collection of many different muscles, some large and some small, each lapped up in a separate sheath or fascia of cellular membrane, connected at both extremities with the parts that it is destined to move, and never attached to the neighbouring muscles except when two or more of these organs are designed to contribute conjointly to some single operation.

Each separate muscle is enclosed in a distinct sheath, as I have just mentioned, and the strength and thickness of the envelope varies with the size and position of the enclosed organ; its use is to bind down the whole muscle and keep it securely in its proper relative position. In some situations a number of muscles together enjoy additional security against misplacement, by being collectively covered by a still stronger and broader fascia, protecting both them and their sheaths. The thigh and the forearm furnish instances of this arrangement.

Upon cutting into a muscle thus enclosed, we find it apparently composed of a number of large fibres, or bundles of fibres, tied together by a portion of cellular substance more delicate than that which composes the sheath. By careful dissection we find each of these fibres composed of many others, still smaller and united by membrane still more delicate. In this way we may go on dividing, through several series of compound threads, until we reach the most slender, which is incapable of farther separation, and is called the ultimate or elementary muscular fibre.

Fig. 8.



The elementary muscular fibre is ascertained by the best microscopic observations to be formed of a great number of little round globules like those found in the blood, ranged in a straight row, and connected by a very transparent jelly-like matter which enters between them, (see. fig. 8.) As to the nature of this matter, anatomists disagree, but it resembles the cellular tissue, and no facts are urged to show that it is not of the same nature.

The direction of the fibres is very various in the different muscles. In some they run the whole length of the organ, side by side; in



others they are arranged like the plume of a pen, and are inserted into a hard white membrane which divides the muscle lengthwise, &c., but it is unnecessary to dwell upon these peculiarities in this hasty sketch of anatomy.

The motions of the muscles are dependent upon certain nerves which will be described hereafter; one or more nerves being distributed to every muscle, and some of their ramifications being supposed to communicate with each particular fibre. If one of these nerves be divided, the parts to which it is appropriated become completely palsied.

When in health, the muscles are always in a state of tension, so that when they are cut across, the surfaces of the incision are dragged slowly and widely asunder by the retraction of the fibres. This tonic contractile power, as it has been called, is of the highest importance; it assists in strengthening the joints by holding the contiguous bones firmly in contact, for in the articulations capable of extensive and various motions, the ligaments are necessarily so relaxed in order to give freedom to those motions that they are not in themselves a sufficient protection to the joint. This fact is beautifully exemplified by the effect of a severe blow upon the great muscle or mass of flesh which covers the upper part of the shoulder. By such an injury the muscle sometimes becomes palsied; it loses its tone and wastes away; the mere weight of the arm then draws the head of the bone away from the joint to the extent of one or more inches. When a bone is dislocated, the neighbouring muscles are sometimes violently elongated and at others they are relaxed, according to the increased or diminished length of the limb resulting from the accident, and in either case they adapt themselves to their new position in the course of a few weeks, so as to give the greatest possible command of the member of which the circumstances of the case admit. When an old dislocation attended with elongation of the limb is reduced, some time is required for the muscles to resume their original tension, and the bones are liable to lose their proper position again for want of support; but when the member is shortened, the contracted muscles offer a tremendous opposition to the reduction, which, when once effectually accomplished, generally remains secure.

Both the tonic contraction, and the motions of the muscles are, more or less, dependent for their strength and permanence, on the nerves—but these organs are much more immediately connected with the latter than with the former function, for when the nerve of a muscle is divided, the command of the parts to which it is distributed is almost immediately lost, but its tone declines very gradually and seldom disappears completely.

There appears to be a strong vital attraction between the particles which compose the muscular fibre; for, during life, the muscles will raise with ease a weight that would tear them to pieces if applied after death!

The motions of the muscles are accomplished by the contraction of all their fibres, which draws the parts into which their ends are inserted nearer together. This motion is in some muscles entirely dependent upon the will during health; in others it is entirely independent, and in others it may be controlled by the resolution of the individual for a certain time, but at length he is compelled to yield to necessity, or the motion takes place in spite of his opposition. Hence the muscles are divided into the voluntary, the involuntary, and the mixed. The first class includes all those which belong to the extremities and spine; the second, embraces those which enclose the bowels and great blood vessels, giving them their peculiar motions, while the third is composed chiefly of those muscles which contribute directly or indirectly to the act of breathing. Each of these classes of muscles owe their peculiar powers to the difference between the several systems of nerves which supply them; but as these systems are all connected together so as to influence each other mutually, we sometimes find, in disease and in moments of violent emotion, the muscles of one class taking on the characters of another; thus in all violent passions those of the face, which are ordinarily voluntary, become completely involuntary. In cholera, all the muscles of locomotion are sometimes affected in a similar manner, and in sudden terror, or in catalepsy, the will is absolutely annihilated. These causes which thus revolutionize the powers of whole systems of muscles are, when acting very severely, productive of instantaneous death. This subject, however, is only intelligible to those who have some knowledge of the nature of the nerves, and we shall not dilate upon it here.

*The Involuntary Muscles* are generally hollow, and are designed to effect the expulsion of the contents of the bowels or other cavities which they envelop; their fibres are generally short, pale, and very irregular. Their action is such as to compress the cavity which they surround and render it smaller. They have less tone than the voluntary and mixed muscles, and yield readily to any distending force that acts slowly, recovering their original length very soon after its removal; but they often oppose, most powerfully, the attempt to distend them suddenly. One or more layers of this kind of muscle envelops each of the principal organs of circulation and digestion. The heart is almost entirely composed of a vast number of fibres of this class, but redder and more like to

flesh than most others; the structure and arrangement of these will be noticed hereafter. The stomach is furnished with various layers of a similar nature, but quite pale or yellowish; the fibres run in many directions, interlacing and overlapping each other in various ways. These layers form what is called the middle or muscular coat of the stomach, because it lies outside of the rough internal or mucous coat that extends throughout the intestines, and within the very smooth serous membrane that covers the bowels externally.

The gullet or œsophagus, and the whole length of the intestines below the stomach, are provided with a similar muscular coat, but here the fibres generally run in a circular direction around the gut. Some parts of the passage, however, have an additional layer of fibres running lengthwise over the former, and acting in such a manner as to shorten the bowel at these spots when such a change is required.

When the intestines are full, these fibres are all stretched to the uttermost, and the mucous coat is comparatively smooth in consequence of the distension; but when they are empty the fibres contract until they nearly obliterate the cavity, and the mucous coat is thrown into wrinkles, or doubled upon itself.

When the tone of any of the hollow muscles is lost, either by frequent and undue distention, or by any injury to their nerves, the action of the corresponding organ becomes feeble, its functions are not properly performed, and the contents being retained too long, often become a source of irritation and actual disease. Many cases of dyspepsia originate in such an affection of the stomach, and costiveness of the bowels, followed sometimes by diarrhœa or purging, frequently results from the same cause.

In the bladder, when any great obstacle opposes the flow of urine, it sometimes happens that the fibres are stretched to such an extent as to destroy their tone entirely, and the organ would inevitably burst if surgical means were not employed for the relief of the patient. Even after the urine has been artificially evacuated in such cases, the organ regains its powers very slowly, and the efforts of nature cannot be depended upon until it has recovered entirely.

The most important hollow muscles are the heart, those of the muscular coats of the stomach and bowels, and those of the bladder, the womb, and the organs of generation; each of these different classes of hollow organs will contract and expel its contents when distended to a certain degree, or when the mucous coat is acted upon by certain irritating substances, but it is remarkable that causes which produce strong contraction in certain fibres have no effect upon certain others. Thus

Ipecacuanha causes the fibres of the lower part of the stomach to contract and close the cavity, while it relaxes those of the upper part, to allow the contents of the organ to be ejected by vomiting. Gamboge, on the contrary, produces an opposite effect by causing an increased rapidity of the natural action by which the stomach propels its contents downwards. Epsom salts and Rhubarb exert their purgative action pretty equally throughout the whole length of the intestines, while the operation of aloes is very much concentrated on the rectum, or lower extremity of the bowels. Healthy urine produces no peculiar effect on the fibres of the bladder, which only begin to contract when they have undergone a certain degree of distention, but the same urine would produce a very different effect upon the bowels if it were received into them, as is proved in some cases of surgical injury.

The involuntary muscles owe their power to a system of nerves found in all animals a little complicated in structure—even in those that are thought to have no brain or organs of voluntary motion. These are the nerves of organic life.

The arteries, or vessels destined to convey blood from the heart, are provided with a fibrous coat similar in many respects, both as to appearance and position, to that of the intestines, but many anatomists deny that it is muscular; be this as it may, the function of those fibres bears a very close resemblance to that of the hollow muscles. The fibres are circular; they have a strong degree of tone, and press firmly upon the blood within; they yield readily to the gradual increase of the circulating fluid, whether it results generally, from high living, or locally, from a determination to the part, as in blushing, and inflammation. They strongly resist sudden distention, so that they do not yield to the force of the heart's pulsations, but remain fixed like solid pipes to allow the blood to circulate regularly in every part. When a bleeding takes place, these fibres slowly contract so as to keep up a constant pressure upon the contents of the vessel by diminishing its size, but if the blood be drawn away very rapidly or to a great extent, they are sometimes unable to contract fast enough, their pressure ceases and the circulation stops, precisely as the jet of a fire hose would stop after an extensive breach in the conduit that supplies it. This is the cause of fainting, which would always prove fatal if the contraction of the fibres were arrested by the suspension of apparent animation; but fortunately such is not the fact; the fibres continue to become shorter and shorter until the pressure on the blood is restored; the vessels then feel the action of the heart, the circulation is re-established, and the patient revives.

The relative strength of this fibrous coat of the arteries goes



on increasing as the vessels divide and become smaller. In the larger trunks it seems only designed to adapt the size of the vessel to its contents, but in the capillary branches it probably influences the force of the current of blood, either by aiding or counteracting the heart's action; and some say it may even continue that current, under certain circumstances, and in certain parts, without the aid of the heart.

This coat, that answers all the purposes of a muscle, is much under the influence of the nerves, and is supplied with that influence by the nerves of organic life; its action is therefore altogether independent of the will, but may be powerfully affected by the mental emotions, like the bowels and other hollow organs.

*The mixed Muscles*, or those which are partly obedient to the will, and partly involuntary, are chiefly concerned in respiration—a function for which the simplest animals have no peculiar apparatus. Even in man it is neither necessary nor advisable that the mechanical effort of respiration should be going on at all times, because we are occasionally placed in situations where such efforts would inevitably occasion suffocation; as, for instance, when the head is plunged into deleterious gases, or when we plunge into the water; and therefore we are kindly provided by nature with the means of checking the operation for a certain length of time. But respiration is absolutely necessary to the life of a complex animal, and it would be very unsafe to intrust the entire command of such a function to the discretion even of reasoning MAN. The muscles of respiration are therefore supplied both with nerves of organic life and voluntary motion. The former hold the sway on ordinary occasions, but when danger threatens, the latter soon take the reins, and compel the animal to make the effort to breathe, however reluctant he may be, and they even continue their exertions, when injury to the brain, or the approach of death render him unconscious of his wants.

The muscles of this class are generally broad, thin, and flat, and are not collected into masses like those of voluntary motion. The most important of them are, first, *the Intercostal Muscles*, a double set placed between the intervals of the ribs, so that there are two between each pair of bones, running from the lower edge of the one to the upper edge of the next, or vice versa. The fibres of these two sets cross each other in their direction, and bind the ribs very firmly together. By their contraction they draw those bones nearer together, and as the upper pair of ribs remain nearly stationary, their joint operation elevates each successive pair, in a greater and greater degree, thus dilating the cavity of the chest, especially at its lower part, and causing the air to rush into the lungs. When

they relax, the ribs return to their former position, in consequence of the elasticity of their cartilages and other causes, and the air is expelled again. Secondly, *the Diaphragm*. This is a broad and thin muscle, commonly called the midriff, which divides the cavity of the chest from that of the belly. Its circumference is attached all around to the lower edges of the ribs and their cartilages, which we can trace so plainly with the hand at the bottom of the chest. Behind, it is attached to the spine. This muscle is so very concave below and convex above, that it may be likened to a basin turned upside down, and the bottom of the basin rises as high as the fourth pair of ribs. The heart and lungs lie upon the upper surface of the diaphragm, and the liver and stomach fill up its cavity. Its fibres run from all parts of the circumference towards its centre, but the whole central part of the diaphragm is composed of a thin white tendon, and the muscular fibres instead of converging to the centre are inserted into the edges of this tendon.

When the diaphragm contracts, the tendon in its centre is pulled downward by its fibres, or, in other words, the basin is rendered shallower, and consequently, the cavity of the chest is then very much enlarged. To fill this enlarged space the air rushes in large quantities into the lungs, and this happens at the same moment that the intercostal muscles contract, all these muscles combine to produce an *inspiration*.

But when the basin of the diaphragm is rendered shallow, the liver and stomach, with the other bowels, are pushed downward, the belly is therefore swelled and its muscles are put upon the stretch. The moment the diaphragm relaxes, these last mentioned muscles recover their position, the bowels, with the liver and stomach are thrust up again, and the air is expelled. This relaxation always occurs at the same moment, both in the diaphragm and the intercostals, and thus is accomplished the act of *expiration*.

There are other muscles which contribute to the act of breathing in various ways and under various circumstances, but this view of the mechanism of respiration is sufficient for our present purpose. More will be added when we come to treat of the function of respiration, and the diseases affecting it.

Of the muscles of voluntary motion, I need say but little here, as they were taken for a model when describing the muscles in general, and their appearance and general characters are there described.

That extremity of a voluntary muscle which is attached to the more fixed parts, is commonly called its origin, and that extremity which is connected with the more moveable parts

is termed its insertion. When there is ample room allowed for both the origin and insertion of a muscle, and when the form of the part is such that its bulk is not productive of inconvenience or loss of symmetry, the fleshy fibres run the whole distance between the two extremities, and the whole organ consists of one great fleshy belly. This is the case with the great muscle already mentioned, that covers the shoulder joint. It originates from a considerable part of the collar bone before, and a still more considerable part of the spine of the shoulder blade behind.

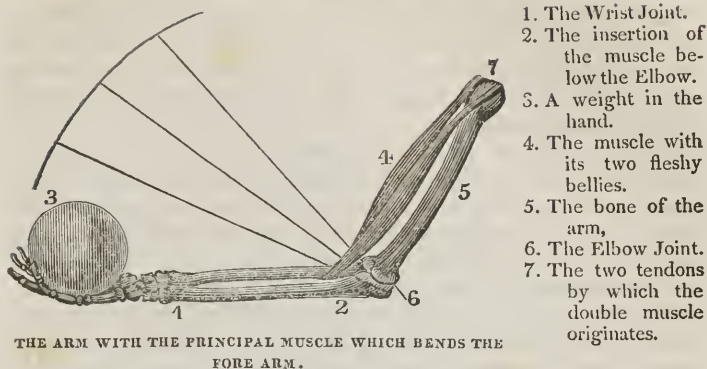
Its anterior and posterior fibres run downward and outward, and those that originate from the point of the shoulder, pass directly downward, so that they are all collected together at their lower extremity into a large rough surface upon the outside of the arm near the middle; and these fibres are fleshy, very nearly from one end to the other.

But if all the bulky muscles of the arm or leg were similarly formed, it is obvious that the shape and use of the limbs would be destroyed, for the thickness of flesh over the joints would then be as great as in the middle of the members. To avoid this difficulty, many of the muscles are terminated, at one or both ends, by white, and very fine cords or membranous expansions, called tendons, into which the fleshy fibres terminate.

As the tendons are vastly stronger, in proportion to their size, than the fleshy bellies of the muscles, they are made to occupy less space and to pass on to their insertion without crowding the neighbouring parts, or destroying the grace and beauty of the person. One of the tendons which furnish the best exemplification of these parts is the *Tendon of Achilles*, so named, because the goddess-mother of the Grecian Hero, is supposed to have held him by that part when she plunged him in Styx, to render him invulnerable. It is felt by the fingers as a rounded riband or cord, behind the ankle joint, running from the calf of the leg, to the point of the heel, and in this small cord are inserted all the muscular fibres that compose the fleshy calf. By the simplest mechanical calculation, it will be found that when a strong man rises on his toes, lifting five hundred weight, this little tendon must endure the tremendous force of one ton and a half, or two tons, yet in bulk, it scarcely equals the little finger.

Many of the muscles are provided with tendons at both extremities, and it is to this arrangement that we owe most of the graceful curvatures that render the human form the most exquisite of the beauties of nature.

Fig. 8.



*The Tendons* are white, fibrous, and nearly inelastic. They do not differ very widely from the ligaments in structure, and are composed, in reality, of cellular membrane very much condensed. The fibres are short and variously interlaced.

Some tendons are round and slender, like that already mentioned. Most of those of the extremities and spine are of this character. They are often confined in their places by ligamentous or cartilaginous rings or sheaths, and where they play over each other, or on any hard substance, they are provided with sacks containing synovial fluid like those of the joints, in order to lessen their friction.

Sometimes we see one of these round tendons passing through a slit in another. This is the case in the hand, where the muscle, which moves the third joint of the fingers, lies below that which moves the second joint. The former sends its long delicate tendons upward, through an opening like a button-hole, in the latter, and thus reaches its destination, without injuring the symmetry of the second joint. On each side of the neck there is a very curious muscle with two fleshy bellies connected by a tendon in the middle. It hangs like a swing from behind the ear to the chin, and it passes in its course, through the body of another muscle, to be attached in the middle to the small detached bone that supports the root of the tongue. One of the muscles of the eye is still more interesting, for its tendon passes over a regular cartilaginous pulley, fixed to the bony top of the orbit; it is then doubled back so as to roll the eye in a direction exactly contrary to that in which the muscle contracts.

There are other tendons, that are broad, thin, and flat, like



a sheet of paper. Such a one has been already mentioned as forming the centre of the diaphragm or midriff, and several others of still greater extent cover the front of the belly. In tendons of this character, the fibres resemble a regular net work. They are designed to make equal and firm pressure over a wide space, and they are more generally met with in the mixed muscles.

Some of the round tendons of the extremities send out lateral expansions which cover and bind down the neighbouring muscles, forming regular fasciæ of greater or less extent. The great flexor of the elbow provides one of these tendinous fasciæ to the muscles of the fore arm.

*The Diseases of the Muscles and Tendons* are not very numerous; their convulsions and their loss of power in palsy, being generally caused, not by any change in their own substance, but by a derangement in the nerves upon which their action depends. The fleshy parts of the muscles are highly vitalized, but their sensation, when in health, is obscure, and is more nearly allied to soreness than pain. When wounded, the feeling produced resembles that of rheumatism. The tendons are absolutely insensible, unless when twisted. Divided muscles unite, like all other parts, by the formation of new cellular membrane between the cut extremities; and this new bond soon takes on an appearance analagous to tendon. It is denied by most, that portions of muscular fibre, when once lost, are ever reproduced in their original form. This we think a mistake, but it is unnecessary to argue the point here. Cancer, Fungus Hæmatodes, Venereal, &c., sometimes produce changes of structure in the muscles, not unlike those noticed in the bones under similar circumstances.

The tendons have very little vitality, as they contain scarcely any blood vessels. When broken or divided, they therefore unite very slowly, and the manner of their union resembles that of a broken bone. Their extremities swell and become soft, their blood vessels enlarge, and then new matter is formed. This requires much time, and at least four months should be allowed before a broken tendon should be called into strong exertion, although from one to two months is often sufficient for a broken bone. A vastly longer period elapses before the parts return to their original condition.

Injuries to the tendons were formerly considered very dangerous, but this idea is now exploded. The evils dreaded do not arise from the wound of the tendon itself, but from that of the neighbouring parts. Thus, when a broad flat tendon is punctured, the part underneath it may inflame and swell, and the pressure of the unyielding tendon makes that swelling exquisitely painful; or, when a round tendon is hurt, where it

passes through a ligamentous canal, the serous or synovial membrane which lines the canal becomes inflamed, and such inflammations are always serious. Many warts are of this character.

The muscles vary in strength and size, more than any other parts, by exercise and use. They may even become so powerful as to break the tendons or the bones with which they are connected, as is sometimes seen in leaping and dancing. Convulsions, and more especially lock-jaw, occasionally cause such effects to a horrible extent.

This peculiar property of the muscles, produces many kinds of deformity, gives the characteristic form to the operations of particular trades, and not unfrequently lays the foundation of consumption and other fatal diseases when exercise is neglected or ill regulated. I shall enlarge upon this very important subject in the chapter on Hygiene.

By very violent exertion or by severe blows, the muscles interested sometimes lose their power suddenly, never to be regained—hence the excessive folly of the extreme exertion of strength, particularly at an early age.

#### OF THE DIGESTIVE APPARATUS.

When the food has been properly masticated, it descends into the alimentary canal to be subjected to the process of digestion.

The alimentary canal is a muscular tube reaching from the back part of the mouth to the anus, but in its course it so involved by turning and doubling upon itself, that if it were stretched out in a direct line, it would be found about six times the length of the body; that is, a man six feet in height, has about thirty-six feet of intestine.

This canal is essentially composed of two cylinders or coats, connected together by a dense cellular membrane which is also sometimes styled a coat. The inner cylinder or mucous coat is rough, wrinkled, and thrown into numerous folds, as if it were much too large for its envelope; it is supplied with such immensely numerous blood vessels, that when they are minutely injected, they seem in some places to form the whole substance of the membrane. It is very plentifully furnished with nerves from the system of organic life, and is possessed of the highest degree of vital activity and irritability; yet, as its nerves have but a very indirect connexion with the brain, its sensations, in health, are obscure. Hunger and thirst are among the natural sensations of this membrane. At both extremities the mucous coat of the alimentary canal is continuous

with the true skin that covers the surface of the body, to which it bears so strong an analogy, except in the source from which it derives its nerves, that it may be regarded as a kind of internal skin. At the two points just mentioned, it receives more twigs from the nerves of sensation, and enjoys a higher degree of sensibility.

The cuticle or scarf skin is continued into the upper extremity of the canal, as far as the stomach, but becomes so delicate, that it is difficult to detect its presence. In all the intervening space between this, and the immediate neighbourhood of the anus, the cuticle is wanting, and the membrane is protected only by the mucus, which it pours out upon its inner surface. When this mucus is removed by inflammation, or by purging in diarrhœa or dysentery, the bowels become liable to severe irritation from slight causes, for they are then reduced to a condition not unlike that of a blistered surface. after the cuticle has been entirely removed; hence, the vast mischief often resulting from the use of very severe medicines in such cases, for by violent measures pursued with the intention of "removing impurities," we remove also the natural protection of this extremely delicate surface. This happens the more readily because the peculiar character of the nerves of the bowels prevents them from giving early notice of the danger.

The mucous coat contains also the smallest branches of millions of the lacteals or little vessels, which imbibe the nutritious parts of the food, in order to convey it to the heart, and circulation, as was mentioned in our first hasty sketch of the principal functions of an animal at the commencement of this work.

The outer cylinder or coat of the alimentary canal is composed entirely of the muscular fibres already described, when speaking of the involuntary muscles, with the cellular tissue connecting together those fibres, and the vessels and nerves that supply them. The principal trunks and branches of the vessels and nerves of the mucous membrane penetrate this coat in countless numbers.

The muscular coat enjoys scarcely any sensibility in health, as it derives its nerves from the system of organic life, but when it is affected by inflammation or spasm, it becomes acutely painful, as we see in cholic and many other diseases.

The use of this membrane is to thrust the food onward as it undergoes the process of digestion, and this it accomplishes by the successive contraction, first, of its upper fibres, and then of those beyond, in due order, thus forcing the contents before them. When, however, any insurmountable barrier is opposed to the progress of the food, or when the individual



has taken a powerful emetic, this action is reversed to a greater or less extent, and the partially digested food is ejected by the mouth.

Fig. 10.



- A, A. A portion of small intestine.
- b, b, b, b. Superficial lacteals.
- c, c, c. A portion of mesentery, or that double fold of peritoneum which binds the small intestine to the spine.
- d, d, d. The first range of mesenteric glands, receiving the small branches of the lacteals from the intestine, and transmitting a few larger branches to the second range.
- e, e, e. The second range of mesenteric glands, collecting the branches of lacteals into still larger trunks.
- f, f. The receptacle for the chyle and lymph, being a slight enlargement of the thoracic duct at its commencement.
- g. The thoracic duct.
- h. The aorta or principal artery of the body.
- i. Lymphatics coming up to the thoracic duct.



In addition to the two coats just mentioned, all that portion of the canal which is enclosed in the cavity of the abdomen or belly, is covered externally with a smooth serous membrane called the peritoneum, to which allusion has been made already. This membrane, after very loosely enveloping the bowels, passes off from the posterior parts of the tube in a double fold, like a towel hanging upon a line, leaving only a narrow strip of the bowel uncovered behind. (Fig. 10. c.) Between these folds the principal vessels of the intestines pass from the great trunks near the spine to their destination, and the lacteals (*b.*) gradually collecting themselves into a few large branches, pursue their route toward the thoracic duct, into which they are all emptied, that their contents may be conveyed by that vessel to the great veins, and thus to the heart.

The double fold of peritoneum coming from the bowels is attached diagonally across the spine, and thus serves to bind the intestines at a proper distance from that column, and to prevent them from getting entangled, while it allows them great freedom to enlarge or contract, or to perform their other necessary motions. The folds are then reflected over the sides of the cavity of the belly, which are thus entirely covered by the peritoneum, so that this smooth membrane is every where placed in contact with itself, and as it is kept constantly moist by its proper serous secretion, all friction between the sides of the belly and the bowels is effectually prevented. The gullet before it passes through the midriff into the abdomen and the last intestine, after it leaves that cavity and enters the pelvis, are the only parts of the canal not covered, wholly or in part, by the peritoneum; it is therefore common to call this membrane the third coat of the bowels; or, if the cellular substance which envelops the mucous and muscular membrane be included under the name of the nervous coat, as it is by some, then the peritoneum forms a fourth coat to the intestines.

The arrangement of the peritoneum is very complex, and furnishes a most wonderful display of the goodness and wisdom of providence in protecting the important organs which it covers; but it is impossible to describe it in detail without transcending our reasonable limits. Nor is it proper to speak at present of the diseases of the bowels; they are numerous and will be described hereafter.

#### OF THE FUNCTION OF DIGESTION.

The food during mastication is broken into small pieces or it is crushed and mingled with the saliva. This process is highly important, for if the various aliments were taken into

the stomach in their crude state, they would often prove very irritating to its delicate surface, and their solidity might render their digestion slow, imperfect, or even impossible.

The saliva is secreted by a number of small glands situated about the mouth, each of which is provided with a little duct or canal to convey its fluid into that cavity.

Of these glands the largest are placed beneath the ear and behind and upon the angle of the lower jaw, on each side. Their ducts are seen opening on the inside of the cheek opposite the second great grinding tooth. When the mouth is opened suddenly we often see clear jets of saliva thrown very forcibly into the mouth from the orifices of these ducts. This gland sometimes becomes inflamed, and it is very singular that this affection often prevails epidemically under the common name of *the Mumps*. It seems to depend on the same general causes with *Influenza*, and may be considered as a variety of that disease, expending its force chiefly on the salivary organs. The gland is called the *parotid*, and the inflammation is described in the books under the title of *Cynanche Parotidea*.

Two smaller glands of the same nature lie immediately inside of the angles of the lower jaw, and discharge themselves by two long and winding ducts terminating on the sides of the bridle of the tongue. They are called the sub-maxillary glands, and when swelled by cold, or in the mumps, they become very obvious, and are commonly called kernels.

Besides these, there are two others—the sub-lingual glands—which we see hanging like a fringe on each side of the bridle of the tongue. They empty their contents through a great number of very small, short ducts, which cannot be detected without close attention.

The canals of the salivary glands may be obstructed by inflammation, or by the formation of stones like those of the bladder, and such accidents may be recognised at once by the rapid enlargement of the gland affected, which does not become immediately hard, as it always is when inflamed, but continues soft, and yields to the pressure of the finger until the distention is carried very far. Such cases require the prompt assistance of a surgeon.

When external wounds penetrate these canals, if they are not immediately closed and healed, the constant flow of saliva often keeps them open, and the fluid, instead of reaching the mouth, is poured out upon the cheek. This is an unfortunate accident, and requires the utmost skill to effect a cure.

The saliva not only has a powerful influence in keeping the particles of food separate from each other, so as to render their passage into the stomach easy and facilitate the action of this

organ upon them, but it also assists in dissolving the food, and thus promotes digestion. Any thing, then, that tends to viciate the quality or diminish the quantity of saliva is necessarily injurious to health.

To return to the food and its progress. When it has been properly divided, and mingled and coated with saliva, it is thrust backward by the tongue. The orifice of the windpipe is then closed by its muscles and the curious little cartilage which acts as a lid to that orifice is shut down, so that the food passes safely over it, to the opening of the gullet. When by accident this lid is not closed in time, the food comes in contact with the exquisitely sensitive edge of the wind pipe, producing a violent spasmodic closing of the tube, to prevent the passing matter from entering the lungs.

Fig. 11.



THE STOMACH.

A, A. Anterior Surface. B. Enlargement of the lower part. D. Cardiac orifice. F, and C. Principal arteries of the stomach. H. The omentum or caul.

How uncomfortable this accident is, must be well known to all who have had the misfortune to "swallow a drop the wrong way."

Once fairly placed in the commencement of the alimentary canal, the food is urged onward by the alternate action of the circular fibres of the muscular coat of the gullet until it is fairly forced into the stomach.

*The Stomach* (fig. 11.) is the first great enlargement of the alimentary canal. It is shaped somewhat like a great bladder, but its upper and lower orifices are near together, but being placed far back toward the spine.

Its position is such that its course lies nearly cross-wise with regard to the body, so that one of its sides, when the organ is full, lies partly in contact with the hollow of the diaphragm or midriff, and partly with that of the under side of the liver, while the opposite side rests on the intestines. (Fig. 13, o.) The gullet enters it immediately after passing the diaphragm, on the left side of the column of the spine, and the small intestine passes out from it, on the right side of the same column, a little lower down.

The small arch of the stomach, which rides like a saddle over the bodies of the vertebræ, from one orifice to the other, is very short and is called the lesser curvature; but the great arch sweeps in from the entrance of the gullet far round the left side and the front of the belly, under what we call the pit of the stomach, and so returns to the place of exit for the small intestine, on the right side of the spine: it is very long, and is termed the great curvature. The stomach thus formed and placed, bears considerable resemblance to a retort, with a very short neck, bent until it nearly touches the bottom. The great bulge of the retort lies to the left and in front, the neck to the right and behind; the throat sits over the spine, and the sides approach the horizontal position, the great end being a little the higher. If we conceive the gullet to enter the bottom, and the small intestine to be connected with the neck of the retort, we shall have no bad idea of the form and position of this important organ.

The food remains in the stomach a considerable length of time, until it is gradually dissolved and converted into a semi-fluid mass, from which the lacteals can extract the proper nourishment.

The whole process of digestion is a wonder and a mystery. The food, while the stomach is in a healthy condition, is completely protected against those changes which would take place in the same period of time in the dead body, and all the alterations which it undergoes are the direct effect of actions purely vital, which chemistry can neither imitate nor explain.



By some unintelligible power, the different articles of food taken, during a meal, are kept wonderfully distinct, and the stomach appears to act chiefly upon one at a time, always selecting those first which are most easy of digestion, drawing them towards its surface by some unknown species of attraction.

It is always the outside of the mass of food that undergoes digestion first, and when this layer is fully prepared, it is passed on into the small intestine, by the regular action of the muscular fibres of the stomach, and another layer of food is then attacked and disposed of in the same manner. Whatever is difficult of digestion, whether in consequence of imperfect mastication of the peculiar nature of the substance, remains to the last, and if the powers of the stomach are exhausted, or the food proves very refractory, it becomes a source of irritation and disease. Hence, the serious consequences to the health, from the early loss of the teeth, and hence, also, the wide spread prevalence of dyspepsia, from that most vulgar of our national habits, the custom of eating our meals with disgusting rapidity.

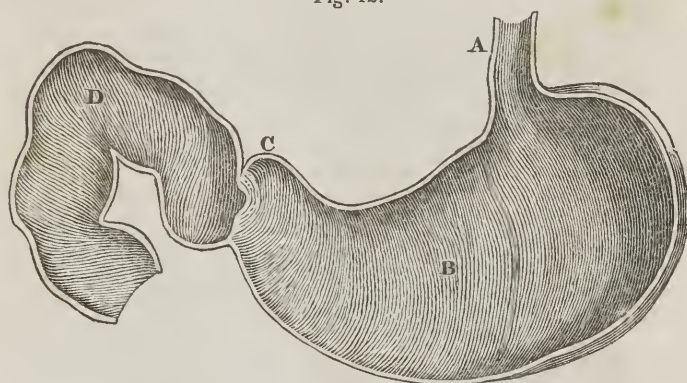
It is a fact that should never be forgotten, that the stomach loses much of its power of digestion during sleep, so that if suppers be taken immediately before going to bed, the organ is compelled to undergo the irritation resulting from the presence of crude food for many hours together. This outrage upon nature is never tolerated with impunity; imperfect slumbers, night-mare, diseases of the heart, sometimes epilepsy, gout, dyspepsia, &c., stand ready to revenge it, and one or other of these ministers of justice is sure to punish the victim of this species of dissipation. When an hour or two intervenes between the meal and the repose, the evil is materially lessened, though not entirely removed, for in that time, a surface of digested matter is every where presented to the stomach, and the oppression from the weight of its contents is the only cause of uneasiness.

It is hardly less injurious to use very active exertion of body or mind immediately after eating. The agitation of the stomach and its contents disturbs the order of digestion and brings portions of crude matter into strong collision with the tender mucous membrane. Moreover there is always a concentration of vital energy in the stomach during digestion; the blood leaving the surface, which becomes cool and sometimes even chilly, and flying in unusual quantities to the alimentary canal. Soon after this the action of the heart is increased and the whole circulation is rendered more vigorous to enable the stomach to effect its purpose. Now when the muscles, brain, or indeed any other organs are called into strong

exertion, they require a similar increase of blood to heighten their powers, and it is wrong to distract the vital energies by calling unnecessarily for their operation in various and distant parts at the same time. (*See chapter on Hygiene, Art. Food.*)

The changes that the food undergoes in the stomach have been attributed by most to the operation of a peculiar fluid supposed to be secreted by the vessels on the internal surface of the organ, and commonly known by the title of the gastric liquor. The very existence of this fluid has been denied by some, but it is unnecessary to argue the point in a popular treatise. It is sufficient to remark that the changes just mentioned consist in the gradual conversion of the whole mass of contents into a semi-fluid substance called *chyme*, mingled occasionally with matters absolutely indigestible, swallowed necessarily or by accident with the food, such as the skins or cuticle of vegetables, cherry stones, pieces of bone, &c. &c.

Fig. 12.



SECTION OF STOMACH.

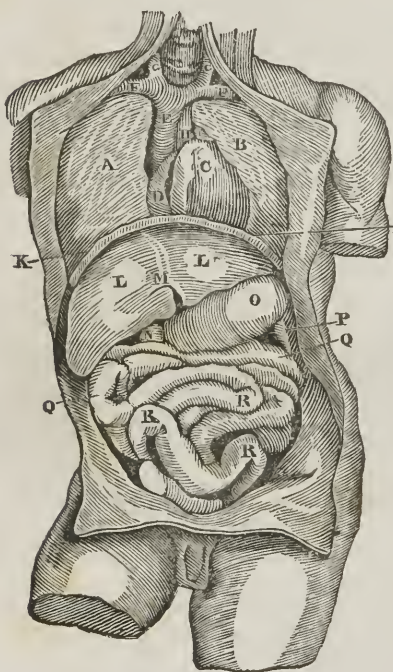
- A. The extremity of the gullet or œsophagus entering the stomach.
- B. The cavity of the stomach.
- C. The pylorus or outlet of the stomach.
- D. The duodenum.

The *Chyme* thus constituted is propelled by the stomach into the first part of the small intestine, commonly called the *duodenum*, (D.) because its length is about equal to the breadth of twelve fingers. Here the chyme undergoes a kind of second digestion before it is presented to the lacteals to be absorbed.

The duodenum has been considered by some as a second stomach. It is a narrow gut commencing at the lower orifice of the stomach on the right side of the spine, and passing near-

ly horizontally over to the left. At the junction of this intestine with the stomach there is a strong band of circular fibres, which close the canal by their contraction, and thus prevent the return of the chyme into the latter organ, (fig. 12. C.) At the other extremity, the duodenum is continuous with the remainder of the small intestine. There are two great glands which pour their secretions into this part of the alimentary canal, and as their agency is all-important to the due performance of the function of digestion it is best to notice them here.

Fig. 13.



- A. Right lung.
- B. Left lung.
- C. Right ventricle of the heart.
- D. Right auricle of the heart.
- E. The great vein descending from the head and upper extremities, called the vena cava.
- F, F. The principal veins from the arms coming to join the great vein.
- G, G. Internal jugular veins coming from the head.
- H. The great artery of the body called the aorta.
- I. Pulmonary artery.
- K. Diaphragm.
- L, L. Right and left lobes of the liver.
- M. Round ligament of the liver.
- N. The gall bladder.
- O. Stomach.
- P. Spleen.
- Q, Q. Situation of the kidneys behind the intestines.
- R, R. Small intestines.

#### THORACIC AND ABDOMINAL VISCERA.

*The Liver* is by far the largest gland of the body, it fills up the principal part of the hollow of the diaphragm on the right side, and extends considerably over to the left of the middle line of the body. Above, it is very convex, but below, it is slightly concave. The hinder edge is very thick and rounded, but the front margin is thin and well defined. The stomach,

when fully distended, fills up a considerable part of its concavity. It is much thicker and more massive on the right side, and gradually becomes attenuated as it approaches the left side of the cavity of the belly, which it never quite reaches, a part of the great end of the stomach being placed between the liver and the latter part. The lower and front edge corresponds very nearly with the margin of the ribs, and seldom passes below that line unless when enlarged by inflammation or long continued fevers. It is divided into several lobes and is kept in place by several double folds of the peritoneum, which covers the greater part of its surface, and is then reflected on to the walls of the belly. So great is the weight of this organ, however, that in falls from a great height, it has been known to tear its attachments, and even to crack its own substance, so as to produce speedy death.

The liver thus placed receives nearly all the blood returned from the bowels toward the heart; the vital current being conveyed to all parts of its substance by the appropriate vessels, which will be described when we come to consider the subject of the circulation. From this blood is secreted the bile, the peculiar fluid elaborated by this gland, and the bile is received, immediately on its formation into the minute branches of the gall duct, which are found in every part of the liver. These branches are gradually collected into larger trunks, which are united continually with each other until they all discharge themselves through one great canal which passes into the duodenum. But in order that this powerful fluid should be reserved in sufficient quantities to answer the demands made upon it under extraordinary circumstances, there is a large reservoir adhering to the concave surface of the liver, which communicates with the duct by a short canal. Into this reservoir the bile flows backward when its presence in the duodenum is not required, (fig. 13. N.)

The exact duty which the bile performs in the business of digestion is not understood, but it appears necessary that a portion of it should be mingled with the chyme, before the nutritious parts of that mass are prepared to be taken up by the lacteals, to be mingled with the blood.

Moreover, the bile is the natural purgative, and its presence is highly necessary to quicken the motions of the bowels in urging forward the useless parts of the food, in order that they may be discharged from the body. When the bile is vitiated in quality, or increased in quantity by disease, it often acts with violence, producing severe and even dangerous purging, and when it is greatly diminished in quantity, obstinate costiveness is the ordinary consequence.

Healthy bile produces no uneasiness in the duodenum, but



its presence cannot be tolerated in the stomach. Whenever it finds its way into that organ, it produces vomiting and is immediately thrown up. This fact gives rise to a popular error in practice which is productive of vast mischief, particularly in the Western country. I allude to the too free use of emetics under the supposition that the patient is bilious. An emetic reverses the natural action of the stomach, and if severe, it extends its influence to the duodenum. In that case the contents of the latter intestine, and of course the bile, if any be present, instead of passing on to the small intestine are returned into the stomach, where they occasion terrible uneasiness, and the vomiting is continued until all the bile is thrown up. This presence of bile in the discharges is taken by the ignorant observer, for a proof of the correctness of the practice. "See what a quantity of bile he had on his stomach; he needed the emetic badly." Now the reader may be somewhat surprised to hear that this very bile was actually brought into the stomach by the very emetic given to evacuate it. If a powerful emetic is given to a man in health,—as soon as the contents of the stomach are thrown up, bile follows, inevitably, not because it previously existed there, but because the medicine has called it there! Emetics are among the most efficient means of promoting the secretion of bile, and if that fluid is already too copious, great mischief may result from their action.

The bile poured into the stomach on such occasions often keeps up the vomiting until the patient dies of exhaustion, or until the over exerted liver loses its power and the secretion stops. In the latter case the patient recovers, with a long convalescence, a stomach without a tone, and a liver without energy, and too frequently the medicine is lauded for saving him from the desperate situation into which it had reduced him by its own agency! Emetics are valuable remedies in their proper place, but let it be remembered that the natural course of the bile is downward.

*The Pancreas* is a long, narrow gland placed in contrast with the posterior walls of the belly, behind the peritoneum. It resembles the salivary glands both in its form and in its peculiar secretion. Its duct is constructed like that of the liver, except that it has no reservoir attached, and it empties into the duodenum, by an orifice almost in contact with that of the gall duct—indeed, they are sometimes united before they enter the intestine.

The process of digestion is by no means completed in the duodenum, for the food is constantly undergoing changes throughout the whole extent of the alimentary canal. The greater part of the nutritious matter, however, is extracted in

the duodenum, and by the aid of the bile and pancreatic liquor, it is converted into a milky fluid, called *chyle*.

*The Chyle*, together with the remaining parts of the food pass on into the other portions of the small intestines, where the former is very rapidly absorbed by the open mouths of the lacteals to be carried into the circulation.

It is a curious fact that however various the quantity of the food taken into the stomach may be, the chyle obtained from it is always of the same nature. Some few substances not properly belonging to this fluid, may enter with it and mingle with the blood, but they are almost immediately thrown out again from the body, either in the urine or in some other excretion, so that the purity of the blood is effectually preserved.

*The small Intestine* is divided by surgeons into the jejunum and the ileum, but this division is arbitrary, and I shall not notice it farther.

After leaving the duodenum, which terminates on the left side, this intestine is rapidly separated to a distance from the spine, nor does it again approach to the walls of the belly, until its lower end enters the great intestine near the right hip. Although its two extremities are separated but a few inches from each other, the tube travels many yards in passing from the one to the other. It winds about and doubles upon itself in every possible direction, until it fills the whole of the middle and lower part of the belly, and even descends some distance into the pelvis or basin when the bladder is empty. Now these folds of intestine would be constantly liable to become entangled and misplaced, were it not for the curious arrangement of the double fold of the peritoneum, which after covering the bowels, runs to be connected with the walls of the belly behind, in the manner already described.

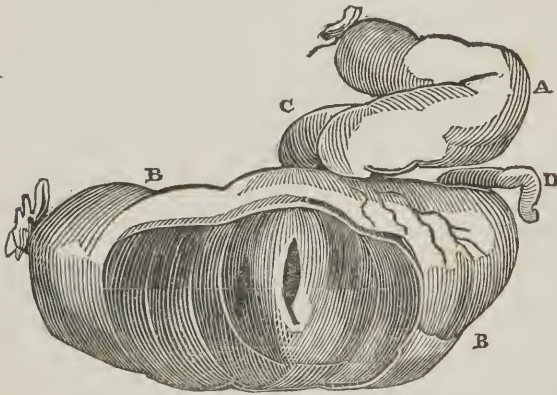
This double fold acts like a ligament, binding the whole length of the small intestine at a proper distance from the spine, without interfering with its necessary motions.

The hinder part of this duplicature is stretched obliquely across from the upper to the lower end of the gut, adhering strongly to the back of the cavity of the abdomen; but its front edge, where it divides to embrace the intestine is lengthened out like the free margin of a fan, or shirt frill, or a half-opened umbrella, so that it follows all the windings of the canal.

The mucous coat of the small intestine is not only too large for the muscular cylinder in which it is enclosed—like that of other parts of the alimentary canal—but it is likewise much too long; so that in addition to the longitudinal wrinkles seen in all the bowels, it is also thrown into large, circular folds that hang loosely in the cavity and considerably diminish its di-

ameter. These folds are so numerous near the upper extremity, that they actually overlap each other as the food passes by them, but near the lower extremity they become smaller and less numerous until they finally disappear. The principal use of these folds or valves, as they have been termed, is to increase the surface in contact with the food, and as the whole mucous coat of this bowel is so covered with little projecting twigs of nerves, and capillary branches of blood vessels and lymphatics, that its surface resembles fine velvet, every part of the digesting mass must necessarily be acted on, and not a drop of the chyle can escape the millions of little mouths always kept open to drink it in:—at least this is the case during health.

Fig. 14.



VALVE AT THE END OF THE SMALL INTESTINE.

*a, c.* Small intestine. *b, b.* Large intestine.  
*d.* A little worm-like appendage of the large intestine.

By the time the remains of the food have reached the lower extremity of the small intestine, nearly all the nutritious matter has been extracted from it, and it is reduced to a soft mass of fæces and mucus mingled with a little water and other fluids. It is then forced into the commencement of the great intestine, which is placed on the right side of the spine near the wing of the share bone. The opening of the small, into the great gut is guarded by a curious valve, formed by an elongation of the coats of the former, which are sloped inward from each side until they leave nothing but a narrow slit, through which the contents may pass downward by pushing the valve open, but if they attempt to return the valve is instantly closed, and they are arrested.

*The Great Intestine* is many times larger than either the duodenum or the remainder of the small intestine, and it is much less regular in shape, being furnished with several strong longitudinal bands of fibres which indent it lengthwise, and also with numerous circular contractions intersecting these bands at short intervals, and dividing the whole surface into small squares. In the intervals between the depressions, the intestine bulges outward, forming as many little domes in which the fæces accumulate and become moulded into the shape that they generally present when discharged, particularly with constive patients. This part of the alimentary canal is still provided with some absorbent vessels, that take up the fluid portions of the contents and gradually harden the fæces; so that when they are long retained in consequence of disease or in old age, they are often discharged with the greatest difficulty.

That part of the great intestine that lies in the cavity of the abdomen is called the *colon*, and the lower portion, which passes through the basin to the anus, is termed the rectum.

*The Colon* is swelled out, at its commencement, into a large receptacle, called the head of the colon; the small intestine enters it at some distance from the end, and in a direction nearly at right angles to its course. This arrangement assists the valve in preventing the return of the fæces.

From the lower part of the right flank the colon runs upward along the flank, near the spine, until it rises almost to the level of the stomach. It adheres to the right kidney, and continues upward until it comes into contact with the duodenum and the gall bladder. It then suddenly springs in an arch all across the belly, touching the lower side of the liver, and passes immediately below, or sometimes, in front of the stomach, covering and concealing the duodenum. It passes immediately along the front walls of the abdomen, and rests on the convolutions of the small intestines. After reaching the left flank, it turns abruptly downwards, adheres to the left kidney, and then finishes its course by a kind of double curve to the right again, terminating at the body of the last lumbar vertebra, where it is continued into the rectum.

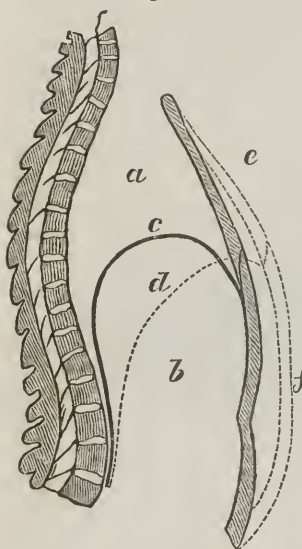
Thus far the remains of the food, now converted into proper fæces, are propelled by the agency of the bowels themselves, but their final ejection cannot be accomplished in health without the aid of the will.

The whole digestive apparatus, except the parts about the mouth, the gullet, and the rectum, are placed in a large enclosure called the cavity of the abdomen. This cavity is bounded above, by the diaphragm, the great muscle of respiration already presented to notice; below by the cavity of the basin, filled in males by the bladder and rectum, but, in females, con-



taining also the womb and other organs of generation; behind, by the lumbar portion of the spine; and at the sides and front, by the wings of the share bone, and a number of broad, flat muscles with their tendons—which fill up all the interval between the brim of the pelvis to the lower margin of the ribs, their cartilages, and the breast bone, from the spine, behind, to the middle bone of the body before. The whole of this cavity is lined by the smooth delicate serous membrane called the peritoneum, which has been already described, and it is completely filled by the stomach, intestines, and the other bowels, with their nerves, vessels, &c.

Fig. 15.



- a. The cavity of the chest or thorax.
- b. The cavity of the abdomen.
- c. The line of direction for the diaphragm when relaxed in expiration.
- d. The line of direction for the diaphragm when contracted in inspiration.
- e, f. The front walls of the chest and abdomen.

The spine, in this figure, is seen in side view, and divided through the middle of the canal for the spinal marrow.

Our limits will not allow us to dwell on the highly interesting and curious arrangement of the different abdominal muscles: their influence on respiration has been noticed above, but on their joint effect in aiding the function of digestion, a few words may be added.

#### SECTION OF THORAX AND ABDOMEN.

It will be perceived that the greater part of the alimentary canal is enclosed in a cavity, surrounded by broad and strong muscles on every side except toward the pelvis or basin, where it rests upon the bladder and rectum. The former of these organs is only separated from the superincumbent intestines, by a thin layer of peritoneum covering its upper surface and forming the floor of the abdomen. When all the muscles contract together, the bowels are pressed downward by the diaphragm, and they are at the same time forced inward by the muscles surrounding the flank and front of the belly; the only direction in which they or their contents can yield to this pressure, is toward the pelvis, where there is no muscle to oppose them; they, therefore, compress the bladder and rec-

tum so as to compel them to evacuate the urine and fæces, and, in this manner, the will of the individual aids the muscular coat of those organs and determines the moment of discharge.

The same forces operate in producing vomiting, when any obstacle to the natural passage of the food exists; for then the contents of the stomach are pressed upward through the gullet, the only practicable outlet. The motions of the abdominal muscles in vomiting are commonly spasmodic, and very powerful.

These muscles also contribute greatly to hasten the movements of the fibres of the muscular coat by their constant and alternate action in respiration; for varied pressure and agitation act as stimulants to a muscle, and promote its contractions: hence the frequency of stools after unusual exercise.

### OF THE CIRCULATION.

Some very general ideas on the subject of the circulation have been already given in the preceding chapter, and in order to avoid unnecessary repetition, the reader is requested to glance his eye over the outline there given, (p. 20, 21,) and also over the remarks under the head of the involuntary muscles, where the fibrous coat of the arterics is mentioned, (p. 59, 62.) I shall then consider him familiar with the meaning of the terms *artery*, *vein*, *capillaries*, *lacteals*, *absorbents*, *fibrous coat*, *serous coat*, &c., and shall employ these terms hereafter without farther definition.

### OF THE CIRCULATING FLUIDS.

The circulating fluids, like all the solid parts of the body, are supposed to possess vitality, that is, they are compounded in a manner which chemistry cannot explain, and they perform operations unintelligible to the student of inanimate nature. Their peculiar form and character are gradually lost, after the death of the body, when death results from mild causes, and the same changes are observed in them when removed from the body in health. In the latter case, if the fluids be instantly transferred to the proper vessels of another individual, they retain their vitality and sometimes produce very little disturbance. But some very violent fevers, the worst form of spasmodic cholera, and more especially great shocks of electricity and lightning, affect the circulating fluids as they do the tonicity of the muscles, the cohesion of certain other solids, &c.; that is, they suddenly or instantaneously destroy

all traces of life, not only in the human frame, but in the fluids likewise.

These facts are sufficient to prove that chyle and blood partake of the mysterious principle called life, in common with all other portions of the body; although the progress of modern science has displaced the old opinion founded on the letter of the Mosaic Law, that the blood is the peculiar seat of the vital principle.

The first branches of the lacteals are so small that the qualities of the chyle that they contain cannot be ascertained with certainty; but when the fluid reaches the thoracic duct, it is white, opaque, devoid of smell, and has a somewhat acid and decidedly sweetish taste. It is composed, like the blood, of solid globules floating in a liquid. When removed from the body, it speedily separates; one part becoming solid like the clot of blood observed in the bowl the day after a bleeding, but wanting the red colour; the other portion serous, like the fluid that surrounds the clot. The solid part of the chyle seems to possess properties intermediate between those of the serous portion and the clot of the blood, being converted into the latter substance after it enters the circulation. The fluid parts, both of the chyle and the blood are coagulated by heat, like the white of an egg when boiled—and this coagulation seems to constitute one of the principal changes that takes place when the liquid matter of the circulation is deposited, in order to form the white solids of the body, such as simple cellular tissue, tendons, ligaments, &c.

The chyle contains all the most important elements that are necessary to the formation of the various organs of the animal: these are oxygen, or vital air; chlorine, or the bleaching gas; nitrogen, that portion of the atmosphere which cannot be breathed alone; hydrogen, or inflammable air; carbon, or pure charcoal; phosphorus, the metallic bases of soda and lime; and iron. Potash and magnesia are the only ingredients found in blood that are not enumerated in the list of results from the analysis of chyle, but the absence of these articles cannot be inferred with certainty. The mode in which these elements are combined in the two fluids differs much more widely.

*The blood* is a fluid so familiar to all, that little need be said of its general appearance. It divides, when removed from the vessels, into two portions, the coagulum or clot, and the serum. The solid part has a strong red colour, but when broken to pieces and repeatedly washed, it becomes white and fibrous in its appearance, and the colouring matter is transferred to the water.

In the simplest animals, those which have no muscles, the animal juices, which may be termed their blood, display no dis-

position to separate into a solid and a fluid portion. In those that have muscles of a white colour and sluggish action, like the reptiles, the blood contains the white fibrous matter of the clot, but wants the coloured globules. Even in man those muscles which are kept most constantly in rapid motion have the deepest colour, while those which act slowly and with little power, like the fibrous coat of the intestines, are comparatively pale. Want of proper exercise renders all the muscles pale and feeble, and diminishes the size of the clot of blood.

Hence it is fair to infer that the solid part of the circulating fluids is designed to support the muscular system generally, and that the red matter gives that system its highest degree of strength and activity. The coloured globules of the blood contain also some of the materials necessary to the formation of other parts, and particularly the bones; but they are evidently decomposed and deprived of their crimson hue before they enter these parts—while in the muscles their proper character appears to be in a great degree retained.

The serum of the blood, contains most of the various ingredients necessary to the formation of the white parts of the body, and probably supplies them with nearly all their nourishment. The principal ingredients of serum are albumen, or the same substance that forms the white of an egg, and water. When heated, this fluid coagulates and is then reduced to a condition that strongly resembles the matter of many of the white solids, at least so far as its chemical properties are concerned. The fluids of all the serous cavities—that thrown out by blisters, and the effusion in dropsy—are of the same character, and do not differ much from each other.

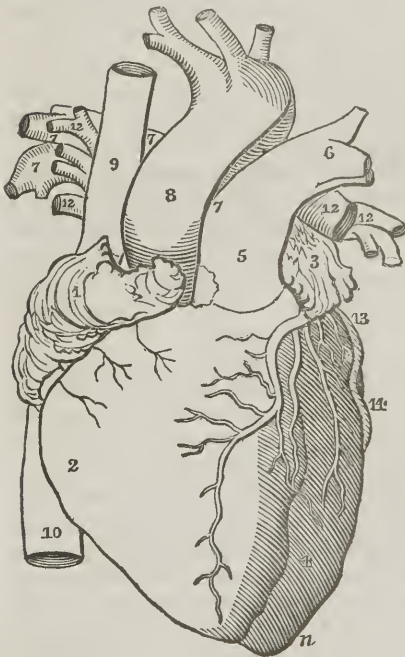
The blood that flows from the lungs to the heart, to be driven out again to supply all parts of the body, is of a bright crimson colour; but that which returns from all parts of the body to the heart, that it may be driven into the lungs, is of a dark purple. The chief cause of this difference of colour is the greater amount of charcoal contained in the returning blood, which is supposed to result from the changes that take place in the capillaries, which vessels separate from the mass of circulating fluid much of its other materials and leave an excess of the carbonic matter. This excess is thrown out from the body by the act of respiration, in the form of fixed air or carbonic acid gas, and by the secretion of bile, which contains it in considerable amount.



## OF THE ROUTE OF CIRCULATION.

The heart lies on the left side of the chest, where it is enclosed in a bag or sack of serous membrane, adhering to the diaphragm or midriff on its upper surface, and suspended above by its connexions with the great blood vessels as they enter the heart. This sack, after surrounding the heart, is folded inward upon itself so as to cover the external surface of the roots of the great vessels and the heart also, being applied to the organ, in the same manner that the peritoneum is applied to the bowels and walls of the belly. It contains a little moisture at all times, so as to give the organ free play, and to prevent friction. When this moisture is much increased, it produces that most fatal disease, the dropsy of the pericardium.

Fig. 16.



THE HEART AND GREAT BLOOD VESSELS.

1. The right Auricle, which receives the blood from the body in general.
2. The right Ventricle, which drives the blood to the lungs.
3. The left Ventricle, which receives the blood from the lungs.
4. The left Ventricle, which drives the blood to the body in general.
5. The pulmonary artery coming from the right Ventricle.
6. Its branch which goes to the left lung.
7. Its branch which goes to the right lung.
8. The Aorta, or Great Artery going to the body in general, from the left Ventricle.
9. The descending Great Vein, coming from the head and arms to the right Auricle.
10. The ascending Great Vein, from the body and lower limbs.
11. Apex of the Heart.
- 12, 12, 12, 12. Pulmonary veins coming from both lungs to the left Auricle.

13, 14. Arteries supplying the substance of the Heart itself.

The heart has four cavities; two to receive the blood, and two, much stronger, to propel it.

The blood collected from the capillaries in all parts of the lungs, flows onward toward the heart, through vessels which are continually uniting and forming larger trunks, until they are finally gathered into four great veins that pour their contents into the first cavity of the heart, called the left auricle. As soon as it is full, this auricle contracts and expels it into the second cavity or left ventricle. The walls of this cavity are prodigiously thick and powerful, for they are designed to urge onward the whole mass of the circulating fluid destined for the nourishment of all the organs of the body. This cavity communicates with only one blood vessel, the aorta or great artery—into which its contraction forces the blood at each pulsation of the heart.

The aorta bends in a great curve from the top of the heart to the spine, and gives off several very large branches in its course that pass upward to the arms, neck, and head. It then descends on the left side of the bodies of the vertebræ, behind the bowels, until it reaches the neighbourhood of the pelvis, where it divides into two great branches, one of which passes to each of the inferior extremities. In the cavity of the chest it supplies the lungs with small branches for their sustenance, but these little arteries are not at all interested in the respiratory function, of which we shall presently speak.

The substance of the heart and the coats of the great vessels, even the aorta itself are furnished with similar branches, upon which they depend for their nutrition.

In the belly, the aorta gives out many arteries, one or more of which reaches every particular organ in that cavity, and others are distributed through its walls.

These great branches go on continually dividing and redividing, until they become capillary and extend to every part of the body. So numerous and universal are these minute ramifications that some of the older anatomists believed that the human frame consisted entirely of blood vessels; and a few writers of a more modern school uphold opinions somewhat similar. It is in these ultimate branches of the great arterial tree, that the blood undergoes the change in colour that distinguishes the contents of the veins, and it is here also that the particles necessary for the growth and nourishment of the solid organs are separated from the circulation.

The blood of the capillaries from all parts of the body, supplied by the aorta and its branches, returns toward the heart through the veins. These blood vessels bear less resemblance to the branches or roots of a tree than does the arterial system, for they are connected together more frequently by intermediate vessels, so that they form a kind of net-work with large meshes, as we may perceive on the back of the hand. As

they approach the heart, they are gradually merged into larger trunks, which generally accompany the great arteries, and at last they are all collected into two only:—one descending from the head and superior extremities, the other ascending from the lower extremities and pelvis. These are called the *venæ cavæ*, and they meet at an angle at the heart where they are united end to end. By means of a large opening at the side of the junction of these veins, opposite the angle, they pour their contents into the upper cavity on the right side of the heart, or the right auricle; this, when full, contracts and forces the blood into the lower cavity of the right side of the heart, or right ventricle, which is much thicker and stronger than the auricle.

By the contraction of the right ventricle, the blood is urged through the pulmonary artery and its branches into every part of the lungs. In the capillaries of the lungs, the blood is subjected to the action of the air. It parts with its carbon, assumes the bright arterial hue, and is rendered fit to renew its course in the circulation, and it is then returned to the left side of the heart through the pulmonary veins, in the manner described at the commencement of this sketch.

The reader will perceive that the whole left side of the heart, together with the veins that enter it and the artery that leaves it, are designed to receive and transmit red or florid blood, while the blood vessels and cavities belonging to the right side of the heart contain only the dark, or, as it is generally miscalled, the venous blood. Thus we have a complete circulatory system, one half devoted to the functions of nutrition and secretion, the other to that of respiration. The opposite sides of the heart differ so much in sensibility that neither can tolerate the presence of the fluid proper to the other. When the respiration is arrested by disease or suffocation, the blood cannot part with its carbon, but passes into the left auricle and ventricle unchanged, and the heart soon ceases to act.

Each auricle, with its corresponding ventricle, stands then in the centre of a long canal with countless ramifications, some tending toward it like the roots toward the trunk, and others passing from it like the branches from the trunk of a tree. There are, therefore, two hearts in reality, but in man they are united together and enclosed in one sack; in some animals they are widely separate. We might carry out our comparison and liken the whole circulation to two trees standing side by side, with their twigs and radical fibres intermingled and united at their extremities.

The human circulation is therefore single; but the association of the two hearts into one, has induced anatomists to de-

scribe it as double. They take the veins of the left and the arteries of the right side together, and call them *the pulmonary circulatory apparatus*, while the arteries of the left, and the veins of the right, are styled *the general circulatory apparatus*. The distinction is too arbitrary, and leads to confusion, for neither of these divisions effect a true circulation without the aid of the other.

Before leaving this subject, two important local modifications must be noticed; the *portal vessels* and the capillaries.

#### OF THE PORTAL VESSELS.

The blood distributed by the branches of the aorta to the bowels in the abdomen, does not return from the capillaries into the corresponding veins like that furnished to other parts of the body, but is collected into an independent set of vessels formed like the veins, but without valves. These vessels are gradually collected into a great trunk called *the portal vein*, which passes into the liver and there distributes its branches, like an artery, to all parts of the gland. It is the dark venous blood of this vessel that furnishes the bile, the proper secretion of the liver, the uses of which have been already noticed. After the hepatic capillaries have thus accomplished their purpose they then pour their contents into the proper veins of the liver, to be carried into the vena cava, where they are mingled with the general mass of the circulating fluids.

The portal system, or, as it has been sometimes erroneously called, the portal circle, resembles another tree with its roots and branches, sitting like a parasite upon the nutritious and respiratory system, and destined to effect one isolated, but all-important secretion. This tree has no heart appended to it, and as it commences and terminates in most minute ramifications, the motion of its fluids must be laborious and difficult, depending very much upon the force of the right side of the heart, which continually drives more blood into its radical capillaries, and the alternate pressure of the abdominal muscles and diaphragm which squeezes its contents into the liver.

Now if any cause should drive the blood from the surface of the body toward the deeper seated parts, it is evident that the weakness of this system would cause it to yield readily to the distention, and this fact assists in explaining many symptoms of congestive fever. Let us take the case of common intermittent. During the chill, there is an irritation of the bowels which calls the blood strongly toward them. The nerves take the alarm and cause the capillaries of the surface

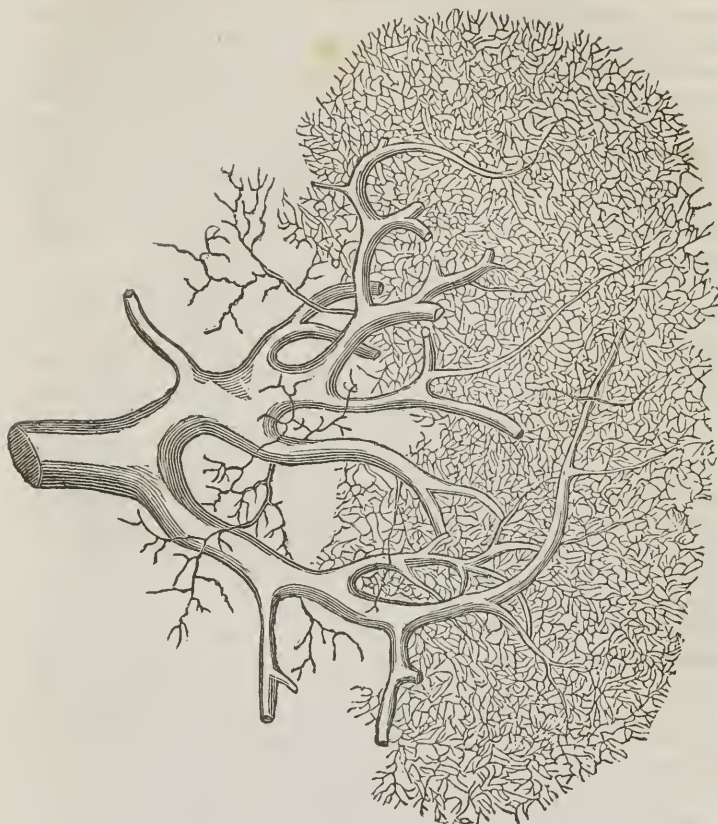


to contract, the patient becomes pale and cold and the blood rushes inward. The heart, bowels, lungs, and brain, become oppressed with blood. But, most of all, the portal vessels often become enormously distended, and the current of their blood is embarrassed. The liver, and more especially, the spleen, swell to a great extent, and the bowels being prevented from evacuating their over-loaded vessels into the portal veins, cannot properly exercise their functions. If this state of things were to prove severe and long continued the patient would die, but the heart soon commences with the tremendous effort to urge the blood onward and equalise the circulation. This produces the fever, and the obstacles to the flow of blood in most parts of the body are overcome; in some places it may prove too rapid, the symptoms of the chill are reversed; the stupor of the brain is succeeded, perhaps, by delirium, or the engorgement of the lungs gives place to inflammation; but the portal vessels are not strong enough to act with corresponding energy, and, although the current recommences its flow, more blood is still received than can pass on with facility. The liver and spleen continue swelled, the bowels are disordered and the secretion of bile vitiated, until the paroxysm passes off. Even then, these organs may be left in more weakened condition than any other parts. If this attack is often repeated, the bowels lose their power, the bile remains constantly defective, the liver and spleen become permanently enlarged, and ague cakes, costiveness, dyspepsia, and nervous debility, may render the sufferer miserable to the end of his days.

This short and very imperfect pathological notice is introduced thus out of place, to keep awake the attention of the reader, and to show the absolute necessity of a knowledge of anatomy, in order to qualify a man to judge of disease and its treatment.

*The Spleen* is a very large organ lying on the left side of the spine at the back part of the abdomen. It resembles a gland, but furnishes no secretion. It is composed almost entirely of blood vessels, (see fig. 17.) and its only known use is to act as a reservoir for the surplus blood of the portal vessels when any diseased or healthy action determines the blood toward the bowels in unusual quantity.

Fig. 17.



RAMIFICATIONS OF THE SPLENIC ARTERY IN THE SPLEEN.

## OF THE CAPILLARIES.

When an artery divides into two branches, it is generally found, that the dimension of the branches, taken collectively, is greater than that of the parent stem; and as all the arteries are divided a great many times before they become capillary, it follows that the caliber of these small vessels must greatly exceed that of the trunk of the vascular tree to which they belong, and this is true with regard to the veins as well as the arteries. Each great division of the circulatory apparatus is therefore compared to a cone, the capillaries forming the

*base*, and the principal trunk, where it joins the heart, the *apex*. Now as the heart propels a given amount of blood at each pulsation, it follows from this arrangement, that the circulation becomes very slow by the time it reaches the capillaries, and that plenty of time is thus allowed, for the separation of the different secretions and the deposition of the various solids, as the blood passes through these remote conduits. Indeed, the smallest visible capillaries in some animals admit but one globule of blood at a time, so that every particle comes within the influence of that vital power, whatever it may be, which rules over the functions of the several organs.

The capillaries are not simply continued from the arteries into the veins, but divide and reunite in every direction until they are formed into a complete and very close net work, so that if one branch be clogged or broken, the blood flows on through other channels; and, unless the injury is very extensive, no embarrassment of function occurs.

The coats of these minute vessels are so thin that their structure cannot be examined. It is only inferred from observations on larger arteries. One thing, however, is certain, they may contract or they may yield to dilatation to an astonishing extent. The former power is beautifully proved by the phenomena of a chill—when we see a fine florid complexion instantly reduced to the extreme of pallor without the loss of a drop of blood. The latter is rendered equally striking, when the enunciation of a name, or word, calls up the tell-tale blood in torrents to the brow of beauty. By this power the capillaries can increase both the amount and the rapidity of circulation in their canals, when any unusual accident demands a concentration of vital power in any particular spot.

There are several functions more or less connected with the circulation, which demand a passing notice here.

#### OF THE FUNCTION OF NUTRITION.

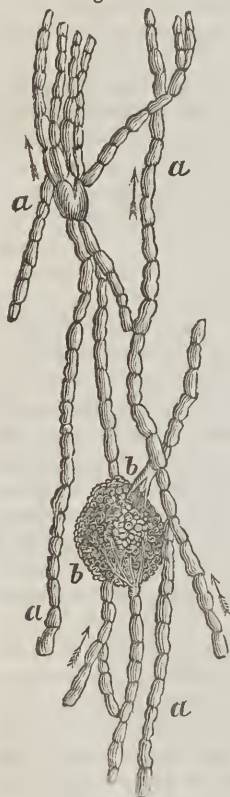
The manner in which the chyle is formed from the food and conveyed into the veins by the lacteals, has been described in the previous section. It enters the right side of the heart, mingled with the blood of the vena cava, from whence it follows the current into the lungs, and is there converted by an unknown process into genuine blood, and forms part of the mass of circulation. Many ingenious theories have been offered to explain the manner in which the capillaries deposite the particles that nourish the different organs of the body, but it would be worse than useless to discuss them here. All that is positively known upon the subject is, that no openings or

terminal mouths can be discovered through which these particles can escape from the vessels. It is probable that they penetrate the coats of the vessels, or rather that they are conveyed through them by some inherent power of the cellular tissue; for many substances are actually conveyed through such membranes after death, where no openings can exist for the purpose. In the complex animals the presence of the nerves appears to be necessary to the due performance of nutrition, and to the selection of the proper materials for each particular organ.

# OF THE FUNCTION OF ABSORPTION.

Fig. 18.

*a, a, a, a.* Lymphatic vessels proceeding toward the thoracic duct.  
*b, b.* Lymphatic glands.



LYMPHATICS.

The lymphatics are very small vessels, somewhat like veins in structure, conveying toward the heart a colourless transparent fluid, taken up by their mouths or capillary branches from all parts of the body. These vessels appear knotty from the immense number of valves with which they are provided. They divide and reunite again in the most irregular manner in their course toward the blood vessels.

The absorbent system is furnished with very numerous glands. Those of the lacteals have been already noticed, and those of the lymphatics are similar in structure. It is supposed that every drop of absorbent matter passes through at least one of these glands before it reaches the circulation, and that it there undergoes some change of structure to prepare it for mingling with the blood. When, as it is thought sometimes to happen, any foreign or deleterious matter is taken up by the absorbents, the gland or glands to which it is conveyed are supposed to arrest its progress by taking on inflammation, and thus embarrass the flow of the lymph until the foreign matter loses its dangerous character, or until the gland swells, suppurates, bursts, and



discharges it from the system. The lymphatic glands, therefore, have been called the sentinels of the circulation. They are very irregular in their disposition, but are commonly associated in greater numbers about the bends of the principal joints, under and above the collar bone, and about the neck.

In the simple animals, it is certain that the general cellular tissue enjoys the power of absorption, nor is it likely that this tissue loses any of its proper functions in man. There is strong reason to believe that the skin, the mucous membranes, and free cellular membrane absorb certain substances with facility, but in man there are numerous vessels expressly designed for a similar operation on a larger scale. They are called *the absorbent vessels*. They are present in almost all parts of the body, and are arbitrarily divided into two classes, the lacteals, (fig. 18.) which have been already described, and the lymphatics, which differ from the former only in the nature of their contents.

We often see the course of the absorbents rendered very obvious in a peculiar state of inflammation following slight punctures with pins, nails, &c., or the bites of small animals, such as rats, mice, squirrels, &c.

Such cases are very common when there is prevalent an epidemic tendency to erysipelas. The wound becomes very painful and wears a threatening appearance; red lines are soon observed running along the limb, and when closely examined we feel that they are caused by as many small hard cords, running along beneath the skin, and extremely painful when touched. These cords are inflamed absorbents, and their appearance has led to the popular, but mistaken notion, that something poisonous is conveyed into the wound by the instruments above named. The symptoms result entirely from the well-known tendency of inflammation to run along the surface of any organ that it attacks until it is arrested by some barrier formed by a substance of a different structure and vital action. This barrier, in the case of the absorbents, is formed by the glands. The inflammation generally advances till it reaches a large joint, where it may be quietly arrested, or, if the glands themselves inflame, the flow of lymph may still be checked, the absorbents above the joint may be protected and the glands may suppurate and form a troublesome abscess. If, however, the inflammation passes the first joint, it generally continues in full vigour to the next, and so on, until in some cases it reaches the body, and the patient's life is then in the most imminent danger, either from the extension of the disease to the blood vessels, or from the exhaustion produced by an immense abscess on the side. Several most distinguished professors of anatomy have lost their lives in this

manner from slight wounds received from the knife in dissecting dead bodies.

If poisons are actually taken up by the absorbents, they rarely display their effects on these vessels themselves, but they may produce symptoms in the glands analagous to those just described. Some poisons, like those of venomous snakes, force their way into the circulation with rapidity, in spite of all the guards, while others reach it very slowly, like those of hydrophobic animals, if indeed there is really any virus present in such animals; a question that is not positively settled, however probable it may appear. The phenomena that are produced by the bite of the rattlesnake and viper seem to show that their poison is received directly into the blood vessels without the intervention of the absorbents, and the same is probably the case with most active poisons.

The strongest proof of the guardianship of the absorbent glands, is the milder inflammation generally observed in those that are seated in the immediate neighbourhood of cancer, and many diseases of the skin; but the whole subject of absorption is still involved in doubt, and the only fact absolutely ascertained is the occasional introduction into the circulation of matter foreign to the blood, through the lacteals, the lymphatics, and the veins.

## OF RESPIRATION.

We have already described the general structure of the thorax or chest, the cavity principally designed to accommodate the organs of respiration. We have spoken of the curves of the spine interested in the function of breathing; the form and motions of the ribs and intercostal muscles; the position and action of the diaphragm or midriff, and the mechanism of inhalation and exhalation; but it is necessary, before we consider the change in the circulating fluids effected by the lungs, to add some farther remarks upon the most essential parts concerned in the act of breathing.

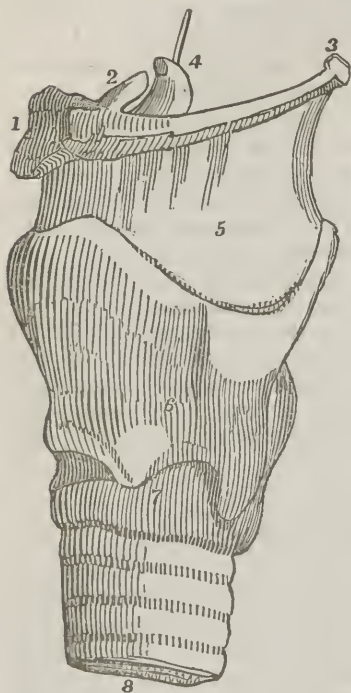
## APPARATUS OF RESPIRATION.

Between the root of the tongue and the upper extremity of the gullet, we find the opening into the canal which conveys the air into the lungs.

The upper portion of this canal is called the *larynx*. It forms the hard tumour which we feel when we grasp the upper part of the throat with the fingers; and its most prominent

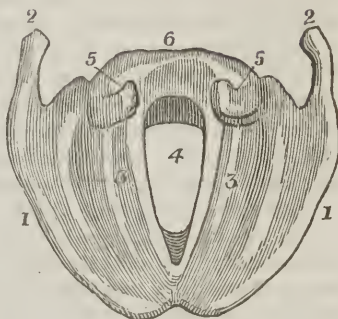
part—much more elevated in the male than in the female—is commonly called Adam's apple.

Fig. 19.



LARYNX SEEN EXTERNALLY.

Fig. 20.



GLOTTIS, OR TRACHEA.

- 1, 1. Thyroid cartilage.
- 2, 2. Greater horns of cartilage.
- 3, 3. The vocal cords, or ligaments of the orifice of the glottis.
4. Orifice of the glottis.
- 5, 5. Arytenoid cartilages, moveable by muscles, and assisting in regulating the voice.
6. Cricoid cartilage.

1. The os hyoides, or bone of the root of the tongue.
2. One of the little horns of this bone.
3. One of the great horns.
4. The epiglottis, or cartilage which closes the windpipe in swallowing.
5. Membrane connecting the os hyoides with the thyroid cartilage.
6. Thyroid cartilage, or cartilage of Adam's apple.
7. Cricoid cartilage, forming the base of the larynx.
8. Part of the windpipe, or trachea.

The larynx is the organ of the voice. It is chiefly composed of five very singular cartilages, covered by nervous membrane, which enclose a large space every where but at their upper end, where the membrane is folded upon itself in

such a way as to resemble a valve, leaving a very narrow chink for the passage of the air.

The two smallest of these cartilages are connected by moveable joints to the lowest of the series. They are placed very near each other, at the posterior end of the chink just mentioned; and two well defined ligaments or cords pass forward from their base to the most prominent part of the larynx, within the folds of the membrane that forms the valve or partition, keeping those folds upon the stretch, and thus determining the size of the orifice. Many small and very delicate muscles are connected with these cartilages, and their various actions render the cords just mentioned either tighter or looser, so as to change the size of the opening, and consequently the pitch and body of the voice.

One of the most curious of these cartilages, is placed just behind the root of the tongue, where it may be seen in some persons by looking into the mouth. Its shape is like that of a leaf standing upright upon its stem. The broad surface answering to the upper side of the leaf is directed backward toward the spine, the back of the leaf toward the mouth, and the stem is united below to the large cartilage which forms the prominence or apple of the throat. This leaf rises high over the orifice of the larynx, and when we eat or drink it is drawn down over the opening so as to allow the food to slide safely into the gullet. When this cartilage acts imperfectly, either from accident or disease, nature still secures the air passages from being entered by the food; for the moment any thing touches the orifice of the larynx, it is spasmodically closed by its muscles, and a cough almost instantly blows away the offending substance. Nevertheless, small substances, such as coins, cherry stones, &c., do sometimes enter the trachea, and it is a curious fact, that the moment they fairly pass the orifice, the spasm ceases, because the continued stoppage of the passage can no longer protect the lungs.

Below the larynx the air passage takes the name of the trachea or windpipe. It is here composed of narrow strips of flattened cartilages, like hoops—that enclose two-thirds of its circumference or more, and are placed almost in contact with each other. The tube is completed by a strong, tough, elastic membrane, that continues from ring to ring along the whole length of the windpipe, and fills up the space behind, where the cartilages are deficient.

The inner surface of the rings, and their connecting membrane, is lined by many fibres of a muscular appearance, running in different directions in different places. As little is known of their use, I shall merely mention them.

The mucous membrane lining the mouth, nose, and gullet



is continued into the orifice of the trachea, and lines the air passages throughout their whole extent. It is here much smoother than in the alimentary canal, and is deprived of the folds that are seen in the intestines. It soon becomes extremely thin and delicate.

The windpipe enters the chest and continues to descend near the spine until it reaches the third vertebra of the back, where it divides into two great branches, called the bronchiæ, one of which passes to the right, the other to the left side.

The great blood vessels and nerves going to and from the lungs are associated with these branches, so as to form with them two considerable masses, which are called the roots of the right and left lung.

The bronchiæ are formed in the same manner with the trachea or windpipe; but as soon as they enter the lungs, they go on continually dividing and becoming smaller and thinner, till their very minute ultimate ramifications reach every part of those organs. Their cartilages are less regularly arranged, and after the first divisions of these tubes have taken place, they surround the whole circumference of the canal. The connecting membrane becomes more and more elastic as it advances, and the mucous coat is at last so extremely attenuated that it is scarcely visible.

Throughout their whole course the bronchiæ are attended by the blood vessels, and both at length become capillary.

At their termination the bronchial ramifications open into the air cells of the lungs, which are little membranous sacks, so small as to be almost invisible, and their coats too thin for a close examination. These cells compose nearly the whole substance of the lungs, and the ultimate capillary blood vessels are every where ramified over their surface, thus bringing the blood almost into contact with the air that they contain.

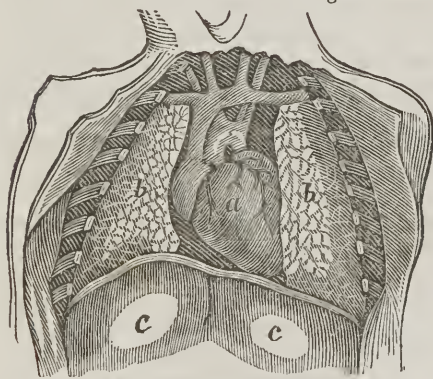
Between the air cells there is a little common cellular tissue, which connects them together, and forms what is called the substance of the lungs. It is the seat of pneumonia or inflammation of the lungs, a disease that differs very widely from inflammations of the outer surface of the organ, and also from those of the lining membrane of the bronchiæ. There are also numerous small glandular bodies called bronchial glands, of which the use is imperfectly known; they are generally found near the tubes from which they take their name. The substance of the lungs is nourished by small blood vessels arising from the intercostal or other vessels belonging to the arterial tree of the left side of the heart, and thus the arteries of the right or pulmonary side are left free to perform the sin-

gle function of respiration without being embarrassed with the duties of nutrition.

The lungs, then, are composed, first, of an air-tube with very numerous ramifications, communicating with the atmosphere, and kept always open by its cartilaginous rings; secondly, of air cells for the reception of the atmosphere when inhaled, communicating freely with the air-tube; thirdly, of cellular membrane, interposed between all the various parts; fourthly, of two distinct sets of arteries and veins; one for the nourishment of the organs, derived from the left side of the heart; the other, for effecting the change in the nature of the blood that takes place in respiration, and derived from the right side of the heart. Besides these more bulky parts, there are the bronchial glands, the nerves and the absorbents.

The lungs, together with the heart and great vessels fill nearly the whole cavity of the chest. When removed from the body, and inflated by air blown into the windpipe, they resemble in form the hoof of an ox, with the hinder part presenting forward. When we examine them particularly, we see that they are divided into two separate organs of the same nature, connected together by the first great branches of the windpipe; the right organ being partially subdivided into three lobes, and the left, which is smaller, into two. The heart, with its investing sac, lies in the middle space between the two lungs in front, and the great vessels, the gullet, &c., pass through the same space behind, so that the lungs are not in contact with each other over the greater part of their proximate surfaces.

Fig. 21.



THE VISCERA OF THE CHEST.

- a.* The heart and great vessels.
- b, b.* The right and left lungs.
- c, c.* The diaphragm.

Each lung is enveloped in its own proper serous membrane, which covers every part of its surface, and is reflected from its root, in a broad expansion that

stretches backward to the spine, and forward to the breast bone, downward to the diaphragm, and upward to the edge of the first rib. From these attachments it is continued over

all the surface of the side of the chest, so as to form a complete sac like the peritoneum, every where in contact with itself, but so smooth and moist as to prevent all friction. These two serous membranes are called the pleuræ, their inflammations are well known under the title of pleurisies.

Each pleura forms, then, a separate cavity, entirely cut off from air or any other fluid than its own secretion, and the two together divide the chest down the middle by a kind of double partition; and, as the heart, closed in the pericardium, lies between the two walls of this partition, the cavity of the chest is divided into three great chambers having no communication with each other; one for the heart and one for each lung.

#### OF THE FUNCTION OF RESPIRATION.

When blood is drawn from a vein, it is at first of a dark purple colour, but after it has been for a short time exposed to the external air, it becomes considerably brighter and resembles blood drawn from an artery. This proves that the atmosphere acts chemically upon the fluids of circulation when removed from the body. Again, actual contact is not necessary to the production of this change, for it takes place when the blood is enclosed in a thin bladder, and suspended in a draft of air. Now it is by no means certain, that the altered character of the blood, in this experiment, is precisely the same with that known to be effected in the lungs of a healthy man, because a similar change of colour is produced by some other gases besides atmospheric air and its several ingredients; yet the change sufficiently proves that chemical agents may act on the contents of a vessel, through its coats, and thus removes the difficulty of accounting for the alteration of the blood in the vessels of the lungs, under the influence of a portion of air which does not come into direct contact with it.

The blood enters the lungs, charged with a great amount of carbon, which must be removed in order to fit it for the function of nutrition. The air drawn into the air cells, is composed of two ingredients, the one, called vital air or oxygen, a gas too stimulating to be breathed with impunity, when pure; the other, called nitrogen, a gas that produces no effect on life, and is merely useful, by diluting the vital air until it is weak enough to be tolerated by the delicate structure of the lungs. Now it is found that when the air is expelled by the lungs, it is no longer composed simply of oxygen and nitrogen; a considerable portion of the former gas is no longer seen, and in its place we find an equal bulk of fixed air or carbonic acid gas, formed by the union of the carbon of the blood with the

oxygen of the atmosphere. So great is the quantity of this fixed air given off by various animals in respiring, that, long ago, it would have rendered the whole atmosphere unfit for healthy existence, were it not for a most wise provision of nature, that this poison thrown out by animals, should be employed as nutriment by vegetables. Plants absorb the surplus carbonic acid of the atmosphere, and thus contribute to preserve its purity.

So great a degree of condensation takes place when carbon and oxygen unite to form carbonic acid gas, that the bulk of the product is precisely the same with that of the aerial ingredient, or in other words, the whole amount of carbon is dissolved without increasing the bulk of the oxygen with which it combines. It is well known that heat is always given out when the chemical union of two bodies is attended by condensation, and such is evidently the case here, yet we do not find the heat of the lungs greater than that of other deep-seated parts of the body: what then becomes of the caloric eliminated in respiration?

We owe the happiest solution of this query to Mr. Crawford, who found that the capacity for heat was greater in arterial than in venous blood. The surplus heat given out by the oxygen in uniting with the carbon, is therefore instantly absorbed and concealed by the altered circulatory fluid; it travels with it to the left side of the heart, from whence it is distributed to all the nutritive capillaries of the body, and as the blood undergoes the changes in these vessels, that reduce it again to the venous character, its capacity for caloric, is there gradually diminished, and the surplus heat is thus diffused so as to produce that equality of temperature observed throughout the body when in health. This theory is so simple and so beautiful that it would be almost a pity to overturn it, but it is not considered as fully established.

The action of the lungs, is not entirely confined to the elimination of the carbon of the blood, and the absorption of animal heat; it likewise contributes in no small degree to the removal of the surplus water of the circulatory fluids, for the air enters the lungs when nearly dry, but it always returns loaded with moisture. In this respect it resembles the skin in function, and may be said to aid in effecting a kind of perspiration.

Respiration, like all the other animal functions, is not absolutely confined to the lungs in man, the gills in fishes, or the branchiæ in insects; for the simple animals that are not provided with a vascular circulation, or with any of the organs just mentioned, evidently respire by the surface of the body,



the only part brought into contact with a fluid containing oxygen. It is equally certain that man also respire by the skin, for not only is that superficial membrane constantly pouring out vapour in the form of sensible or insensible perspiration, but carbonic acid gas is also found escaping from it in the same manner, without intermission. The complexity of the human frame, however, renders it impossible for the skin alone to free the whole amount of blood from its excess of carbon, and the peculiar apparatus of respiration is therefore superadded to complete the process. Still, it is well to remember that the lungs and the skin are designed to aid each other reciprocally, hence, want of cleanliness, continued exposure to cold or damp air, improper clothing, and all other causes that tend to disturb the functions of the latter and to check the escape of perspiration, necessarily compel the lungs to perform double duty; they are therefore seriously oppressed by such causes, and these are indeed the foundation of many diseases of the lungs.

When any of the cavities of the body are exposed, or when air is admitted into the common cellular tissue by a wound, the same changes in the blood of the neighbouring vessels takes place to a greater or less extent, or, in other words, we respire by the injured surfaces. This occasions an increased vital activity in the part, and is probably the cause why air has been considered so powerful a stimulant by some writers. The irritating qualities of air have been vastly exaggerated, but the effect just noticed is actually produced, and it is therefore very well to exclude it from places where nature never designed it to enter.

#### OF SECRETIONS.

We have already spoken of most of the very important secretions under the foregoing heads. In treating on *Digestion*, we mentioned the saliva, the pancreatic liquor, the bile, and the intestinal mucus; under the head of respiration we spoke of the disengagement of carbon and water from the lungs and skin, and of animal heat from the general capillaries; all of which products may be regarded as secretions.

*Secretion*, then, is the separation of certain substances from the circulatory fluids by the capillary blood vessels. It takes place in the interior of every organ, producing its growth and renovation. It is seen on the external surface producing perspiration, on the internal surface in the form of mucus, and in the lungs, effecting the separation of carbon and moisture from

the blood. In the secretory glands, it elaborates fluids that are generally rendered useful in some way or other before they are ejected from the body.

There yet remains one of the most important secretions, of which it is necessary to take some notice. I allude to the *urine*.

#### OF THE URINARY APPARATUS.

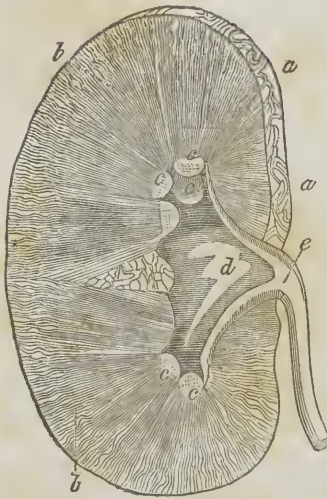
The kidneys are two large glands destined to secrete the urine. They are placed, one on each side of the spine, behind the peritoneum, and opposite the two lower vertebræ of the back and the two upper ones of the loins. The right kidney is placed a little lower down than the left, to allow more ample room to the liver, which is nearly in contact with it. These organs, therefore, cannot be regarded as part of the contents of the abdomen, and they have no connexion with the portal blood vessels.

The form of the kidneys is too well known to require any description; for those of the ox and the sheep, which are frequently seen on the table of such as are not too fastidious in their taste, convey an idea sufficiently accurate for the non-medical inquirer.

The outer part of the kidney is so full of minute blood vessels that when these are injected with wax, and the animal matter removed from around them by air and acid, they preserve the general form of the organ, and present us with one of the most beautiful anatomical preparations that can be imagined, so much so, indeed, that it is not unusually employed as a mantel ornament by anatomists!

On the inside of this vascular shell of the kidney we may observe a paler substance, formed into a number of little nipple-like eminences, all pointing toward the great fissure in the middle and inner side of the gland. These eminences are chiefly composed of very small vessels, or rather ducts, which are arranged side by side in great numbers, and are designed to convey the urine from the capillaries as it is formed. Each nipple is generally enclosed in a separate membranous funnel which receives the urine from the ducts, collects it, and then pours it into a large membranous sac called the pelvis of the kidney.

Fig. 22.



SECTION OF KIDNEY.

- a, a.* Cortical substance.  
*b, b.* The tubular portion.  
*c, c, c.* The papillæ.  
*d.* The pelvis of the kidney.  
*e.* The ureter, or duct, carrying the urine to the bladder.

The pelvis of the kidney is the common receptacle of the urine from all the eminences above described. It occupies the greater part of the fissure of the kidney, and from the side next the spine it sends out a long canal or duct called the ureter, which passes along behind the peritoneum into the pelvis, where it enters the bladder at its lower part. The urine flowing constantly and without intermission from the kidneys, through the ureters into the bladder, collects in this great reservoir until it is convenient to evacuate it. The loss of this control over the flow of the urine, which sometimes results from surgical injuries or disease, is one of the greatest evils that can befall humanity.

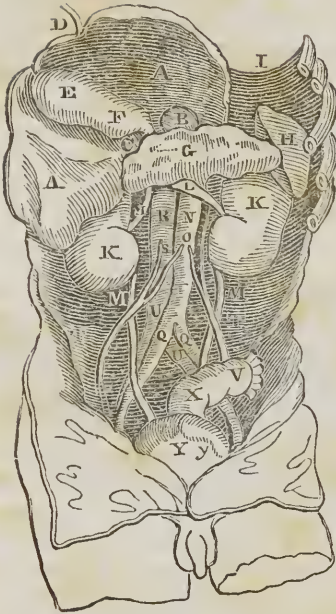
The bladder, when empty, occupies very little space, and lies entirely within the pelvis; but when distended with urine, it rises high into the abdomen, always in front of the bowels, which it thrusts out of the way until in extreme cases it has been known to rise even to the pit of the stomach.

The structure of the bladder resembles that of the hollow bowels so fully described above. It has the internal mucous coat,—but without valves or obvious villosity;—the condensed cellular coat; and the external muscular coat,—over which we find the peritoneum covering the upper end, a small portion of the front, and somewhat more of the posterior side of the bladder; but the extent to which this viscus is covered by the peritoneum depends mainly on the degree of its distention at the moment. The lower part of the bladder is always free from such investment.

One of the strongest peculiarities of the bladder is the close proximity of the three canals; the two ureters bringing the urine to the reservoir, and the urethra conveying it to the surface: their openings form a small triangle at the lowest part of the organ.



Fig. 23.



VISCERA OF THE ABDOMEN AND PELVIS—  
THE STOMACH AND BOWELS BEING RE-  
MOVED.

- A, A. The concave surface of the liver turned up.
- B. A small posterior lobe of the liver.
- C. The cleft where the portal vein reaches the liver.
- E, F. The gall bladder.
- G. The pancreas or salivary gland of the abdomen, lying across the spine.
- H. The spleen.
- I. The ribs.
- K, K. The kidneys.
- L, L. Renal veins.
- M, M. Ureters, or ducts, leading from the kidneys to the bladder.
- N. Aorta, or artery of the body.
- O. Spermatic arteries.
- Q, Q. Common iliac arteries.
- R. Vena cava, or great vein of the body.
- S. Spermatic vein of the right side.
- U, U. Common iliac veins.
- V. The end of the colon, tied.
- X. Commencement of the rectum.
- Y, y. Urinary bladder.

*The Urethra* is the membranous canal that conveys the urine from the bladder when evacuated. It is the seat of several painful diseases, but it is not consistent with our present

purpose to mention them here.

The urinary apparatus gives us an excellent idea of the structure and arrangement of the excretory ducts in general. At the outer orifice of the urethra, the skin is reverted inward, but almost as soon as it enters the canal, it assumes all the characters of mucous membrane. The cuticle continues to cover its surface for some distance, but soon disappears, and the mucous membrane advances alone. When it enters the bladder, it expands so as to line the whole organ, and then proceeds through the little orifices of the ureters, which it follows throughout their whole extent. On reaching the pelvis of the kidney it again expands, lines the whole of those cavities, the funnel-shaped sacks, the nipple-like projections, and in all probability, the ultimate urinary ducts likewise, though the extreme minuteness of the last mentioned canals renders their exact structure invisible. Such is the arrangement of all the outlets of the body, whether found on the internal or



external surface, whether they open into the bowels or on the skin. Properly speaking, there are no such things as passages from within the substance of the body; for the integuments dip into every cavity, and so line and invest it that every part is covered either by the skin or mucous membrane, or some reflection thereof. When a part is exposed to the air it assumes the appearance of true skin, and becomes covered with cuticle, whereas, if it is protected at all times from such exposure, it retains or acquires the character of mucous membrane.

### OF THE URINE.

*The Urine*, the peculiar fluid secreted by the kidneys, is very different in character in different tribes of animals, and in various individuals. It even changes its properties in the same individual, according to the nature of the diet and the time of day, in health—or, according to the peculiar character of the attack, in disease.

It is, however, one of the most important agents in the purification of the blood. It removes a very large portion of the superfluous water from the circulation, and this is accomplished in so short a time after drinking, that many anatomists were formerly deceived into the belief that there existed some route by which water could be conveyed from the stomach to the bladder more directly than by passing into the blood. In this particular the kidneys seem to aid the functions of the skin, and it is well known that when perspiration flows freely the quantity of urine is diminished, and generally becomes high coloured. On the contrary, when perspiration is checked by any means, without fever, the urine is generally more copious and watery.

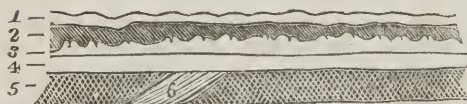
Urine contains a considerable amount of an animal substance peculiar to itself, of which the largest constituent is nitrogen; and it is, therefore, thought that the kidneys are designed to separate from the blood the surplus of that element, which is present in almost all parts of the body, and furnishes one of the strongest distinctions between animal and vegetable matter in general. Most of the peculiar ingredients of the body are occasionally present in the urine, and those which are capable of assuming the solid form, are sometimes known to crystallize in the urinary passages, giving rise to gravel or stone—one of the most painful diseases to which man is subject. Sometimes the stone forms in the pelvis of the kidney, where it may grow and occasion inflammation and abscess, or it may descend through the ureter, giving rise to most ago-

nizing pain in its route. If it reaches the bladder it generally remains unnoticed for some time, but as its growth is continual, it finally brings on violent irritation, and all the symptoms of the disease termed stone in the bladder. Sometimes great numbers of small stones descend the ureters, and from their diminutive size, are washed out of the bladder almost as rapidly as formed, constituting what is commonly called gravel. Now and then a piece of gravel unusually large gets clogged or arrested in the urethra, or external passage. The urine is then entirely checked, and prompt assistance is required to save the life of the patient.

We have now enumerated most of the essential systems and organs of the human body, except a few which are not fitted to appear in a popular work, and before we proceed to mention the connecting bonds which cause this most curious apparatus to act correctly and without disorder, it only remains for us to add a few words upon the envelope or mantle, which covers and encloses this complex machine, constituting at the same time, the general armour of the system and a distinct organ for the performance of most important functions.

## OF THE SKIN OR INTEGUMENT.

Fig. 24.



SECTION OF THE SKIN.

1. The cuticle or scarf skin.
2. The rete mucosum, or coloured stratum of the skin.
3. The papillæ of the skin, on the surface of the true skin.
4. The cutis vera or true skin.
5. The subcutaneous cellular tissue.
6. Some fibres of cutaneous muscle.

*The Skin or Integument*, as we have already noticed in our introductory sketch, is an envelope, enclosing the whole surface of the body, composed of condensed cellular tissue, with a horny and inorganic surface, which it secretes for its own protection. It may be divided into three distinct layers; first, the cutis or true skin; that part which may be converted into leather by tanning; secondly, the rete mucosum, or mucous net work; that part which gives the peculiar colour to the races and varieties of mankind; and lastly, the cuticle, or horny covering, which is insensible, inorganic, and seems like a mere dried secretion, designed for the mechanical protection

of the other layers. This division is carried farther by modern anatomists, but it is unnecessary to dwell upon minutia in the present work.

*The Cutis Vera, or True Skin.* This is a very strong, tough membrane, composed of the free cellular tissue which forms the general bond of union between the various organs of the body, gradually condensed, and strengthened by firmer fibres. On its inner surface it is loose in texture, and rough, but it soon becomes comparatively hard, without losing its flexibility. It is every where covered with little holes or rings, filled with softer matter, through which the capillary arteries and veins, with the nerves and absorbents of the skin pass and repass to the surface of the layer.

In some places, this layer is very thick and firm, as on the palms of the hands and the soles of the feet, while in others it is exceedingly thin and delicate, as in the neck and the bend of the different large joints. In parts designed by nature to sustain repeated shocks, the true skin becomes thickened by frequent rough usage, but in those which are protected by their situation, pressure is apt to occasion a thinning and ulceration of the membrane.

*The Rete Mucosum or Mucous Net Work.* As soon as the nerves and vessels of the skin have passed out through the rings or meshes of the cutis, they display themselves on its exterior surface. The vessels ramify and communicate with each other to a great extent, and their attendant nerves are enlarged and softened so as to become acutely sensitive to every impression. This arrangement produces a great number of little eminences or projections, resembling in some degree, the villi of the intestines. They are called the papillæ, and are formed of the naked, soft, and expanded terminations of the most minute branches of the nerves of feeling, surrounded by a multitude of capillaries, twisted, united, and involved with each other in the most complex manner.

This arrangement is intended to give the greatest quickness of sensation to the touch, and wherever great delicacy of feeling is required, the papillæ are more numerous and better defined, as at the point of the fore-finger, the tip of the tongue, &c.

These papillæ, or villi, are protected by an extremely delicate cellular tissue, filled, and surrounded by a kind of mucous varnish, from which it takes the name of the rete mucosum, or mucous net work. It forms the second, or middle layer of the skin, in which is deposited the colouring matter that gives variety to the complexion. When this colouring matter is entirely absent in the white race, we observe that peculiar transparency of the whole surface which marks the albino;

and it is very remarkable that in such cases the peculiar colour of the eye is also wanting, so that the blood vessels of that organ, like those of the skin, shine through the surface and give the iris a bright red tint, while the hair is rendered snowy white, by the same general cause. A deficiency of this deposite renders the complexion, the eyes, and hair, light, as we observe it in persons of a scrofulous or consumptive constitution, and an excess produces, in like manner, the dark skin, the black eyes, and hair of the brunette.

*The Cuticle or Scarf Skin*, appears to be devoid of animation; it contains no blood vessels, no nerves, no cellular tissue, but seems to be a mere incrustation on the surface of the rete mucosum, by which it is thrown out. We see it elevated in blisters, because the inflammation producing them, causes the vessels of the skin to secrete a large quantity of serum in place of the matter fitted to form cuticle.

The scarf skin is continually worn off by friction, and is as constantly replenished from within. It is divided into little squares or lozenges by numerous wrinkles running in various directions and crossing each other. It is studded with hairs, which are generally found at the intersections of the wrinkles, and on the fingers and toes it is armed with nails.

It is a popular idea, to the truth of which the older physiologists acceded, that the cuticle was perforated by innumerable holes, called pores, through which the perspiration escapes to the surface; but this idea is now proved to rest upon no solid foundation. The most minute microscopic investigations show that there is no breach in the continuity of this mantel: even the hairs, though their roots are found deeply imbedded in the inner membrane of the skin, do not in reality pass through it; for the cuticle is reflected inward around each hair until it reaches the bulb, to which it adheres, and then returns along the hair, with which it is so completely amalgamated that it is impossible to separate them.

Pores, then, do not assist in the skin, yet it is certain that sensible and insensible perspiration, gases, &c. pass through it from within, and it is highly probable that some substances enter the system by the same route. This power of transmitting gases or fluids, is now known to be common to all organized membranes, whether animal or vegetable, both during the life and after the death of the individual to which they belong; thus, if a piece of bladder, in which there exists no opening, is tied over the mouth of a bottle of spirits, the water of the spirits evaporates and passes through the bladder with rapidity, while the more volatile alcohol is retained much longer, so that the spirits, in time, become stronger; while, on the contrary, if there be no bladder placed over the bottle,



the alcohol will evaporate and leave most of the water behind.

It is not by clogging the pores then, that dirt impedes the flow of perspiration and injures the health, but by covering the cuticle with a kind of varnish which necessarily impedes the exit of fluids through its substance, in the same manner that a coating of resin prevents the passage of water or vapour through a bladder.

### OF THE FUNCTIONS OF THE SKIN.

The general function of the skin is to give form, grace, pliancy, and afford protection to the surface of the body, as well as to prevent the rapid evaporation of animal juices. The special functions of the true skin, are to give support to the delicate nervous filaments upon which the sense of touch depends, and to furnish a secure foundation for the net work of minute blood vessels that are distributed upon its outer surface, by which the cuticle, nails, hair, and all other appendages are formed, and the perspired matter secreted. The cuticle, as has been already remarked, presents no appearance of organization, and cannot be considered as executing any peculiar function; for in transmitting the perspiration, it probably acts like any other animal membrane. We shall have occasion to speak farther on the subject of the cuticle, under the heads of cleanliness and clothing in the chapter on *HYGIENE*.

### OF THE NERVES.

All animals of complex organization require some medium of connexion between their different organs, some established government to direct the efforts of the various departments of the system toward a common purpose—the growth, health, and good order of the whole. This bond is furnished by the nerves.

*The Nerves*, are small fibres or bundles of fibres passing from one part of the body to another. They generally originate in one or more masses, called nervous centres, and are distributed at the other extremity, in minute divisions to all parts of the several organs supplied by them. They are so important, and their operations are so little understood, that we may be excused for dwelling upon their history at some length. If, by so doing, we should succeed hereafter in persuading our readers that the long train of human ills usually classed under the head of *disordered nerves* and *nervousness* are really

among the most painful, unmanageable, and serious afflictions to which we are subject, if I succeed in eliciting an occasional sigh of sympathy for sufferings too generally witnessed with a smile, or a sneer, the cause of humanity will be served and my labour amply rewarded.

*Nervous Matter*, or the substance of which the nerves is formed, is commonly divided into two kinds.

The one kind is gray, soft, and not very obviously fibrous, and is found chiefly at the origin of the particular nerves, although many anatomists are of opinion, that they are composed of this kind of substance at both extremities. The other kind of nervous matter is white, and is invariably arranged in well marked fibres, either separate or collected in bundles.

Fig. 25.



When carefully examined by the microscope, aided by certain chemical measures, both these varieties of matter are found to be ultimately composed of small globules of a peculiar character united together by cellular membrane of extreme delicacy. The globules are irregularly placed in the *gray*, but are ranged in rows in the *white* substance; and these rows always remain distinct; never mingling or becoming confused in their course. Such a row of nervous globules continued,

without interruption, from the gray substance in which it originates to its termination at the surface or in the substance of some organ of the body, constitutes what is called a *nervous filament*.

A *Nerve* is a cord composed of a number of nervous filaments formed into a bundle, like a skein of silk after it is cut and prepared for the thread-case. In addition to the very delicate cellular membrane connecting the globules of which the filaments are composed, each filament is generally found enveloped in a sheath of stronger cellular tissue, and the whole nerve is also provided with a similar covering of still firmer character. Small blood vessels are observed to enter the nerves, and the ultimate branches are distributed throughout the substance of their connecting membrane, in order to nourish and enable them to maintain their functions. The strength of the sheaths surrounding the filaments has induced many anatomists to describe the nerves as collections of tubes filled with nervous matter, but they are really solids composed of the several parts just specified.

The *consistence and colour of Nerves* are somewhat different, in different parts of the system; their functions are equal-

ly various, but the relation between their structure and uses is still among the unfathomed mysteries of nature.

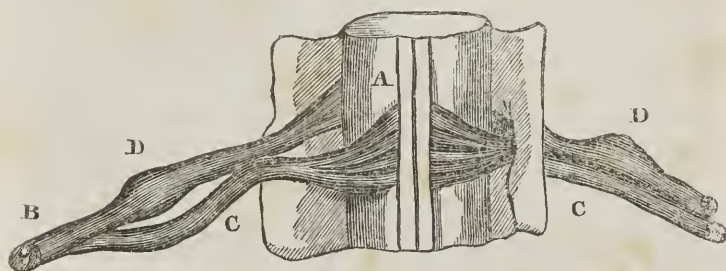
*The proper function of the Nerves* is best expressed by the term sensibility, but this word is not used here in its popular acceptance, and we are, therefore, compelled to illustrate, at some length, the extension which must be given to it.

Each individual nerve, or corresponding pair of nerves, has its own kind of sensibility; thus, those of the eye distinguish light and colours; those of the nose, odours; those of the ear, sounds; some of those of the tongue, flavours; those of the surface, touch; and thus far all is perfectly intelligible. But there are other nerves whose powers bear little or no resemblance to what is commonly called sensation. Hunger, thirst, and some other obscure feelings perceived by the nerves of the stomach or bowels, are indeed, in some degree, analagous to the five external senses; and, by using the word sensation metaphysically, we may apply it to the feeling of anger, affection, and many other instincts, each of which has its appropriate set of nerves, forming part of the substance of the brain. How different these characters are from those of the nerves of voluntary motion, which may be torn or twisted without giving pain to their owner, and perceive nothing but the mandates of the will which they convey to the muscles, compelling them to execute the orders of the mind! Still more widely removed from our received notions of sensation are the powers of the nerves of involuntary motion, for in health, the mind remains alike unconscious of the impressions made on them, and the actions which they determine;—yet even those nerves receive impressions from various causes, either internal or external, and proceed to the accomplishment of their rightful duties, as if endowed with a special intelligence, not under the cognizance of the brain; and we can find no better term than sensibility, by which to express their function.

*The connexions of different nerves*, take place in two distinct ways, we have already stated, that the filaments are not obviously combined together in any part of their course, but single threads, or groups of threads, from a bundle or nerve, are continually passing off in various directions to be distributed to the organs, or to unite with similar threads from other sources, to form a new nervous trunk. We often observe a number of nerves, thus divided and reunited again and again, until they form trunks, each of which contains some filaments from every one of the parent trunks; hence, results a nervous net work called a *plexus*. Now, these *resulting nerves* must possess compound functions, for each filament still retains the powers peculiar to its parent trunk, so that if such a trunk be divided or injured, the parts supplied by it

may be deprived of several powers at once. For instance, each of the great nerves of the extremities originates in the spine by two distinct cords, which soon unite together as do the branches in a plexus; or rather, they are each formed of two nerves, which unite near their origin to form one trunk. If we cut the posterior nerve above the point of union, the corresponding member loses the sense of feeling; if we divide the anterior nerve in the same manner, the limb loses its capacity for voluntary motion; but if we divide the united trunk, or any of its branches, we instantly deprive the parts supplied by the dissected filaments, of both motion and sensation.

Fig. 26.



- A. Spinal marrow viewed in front.
- B. A spinal nerve.
- C. Anterior root of a spinal nerve.
- D. Ganglion of the posterior root of a spinal nerve.

As the nature of this mode of communication is very important in a practical point of view, I will give it one more illustration, at the expense of being compelled to anticipate a few statements belonging properly to other departments of the work. It is known that when any part of the body is injured, and the nerves of that part partake of the injury, the morbid effects of that injury are not confined to the corresponding extremity of those nerves, but that the portions of the brain, spinal marrow or other nervous centres, in which the other extremity of the nerves terminate, are also affected, and this arrangement is indeed indispensable; for, by no other means, could those nervous centres receive instant intelligence of the mischief done, or threatened, so as to call into action the general powers of the system, to effect the work of defence or repair.

Now if the injured nerve passes into no plexus on its way to the nervous centre, the consequent irritation of the other extremity is of course circumscribed within a small space,



as when the eye is hurt by too powerful a glare of light, the optic nerve having no connexion in its course with any other except its fellow on the other side, mischief occasionally results at the spot where those nerves arise, but not immediately, in other parts of the spine or brain. But if the part injured is supplied with nerves from a plexus; the irritation is frequently extended to the origins of many or all of the nerves that contribute to form that plexus. Hence, arise very complex symptoms from apparently simple causes, and a host of phenomena too often classed under the vague head of sympathy. Let us give one of the most simple examples.

A man receives a hurt upon the arm or leg. He feels pain, for the injured nerves of feeling convey notice of the accident to the brain, but this is not all. The nerves of voluntary motion are intimately associated with those of feeling, and the former are likewise disturbed by the injury, so that not only is the patient led to avoid all motion of the part by the exercise of the will, but nature, desiring to render assurance doubly sure, deprives him in this way of the power of acting vigorously, in opposition to her dictates. Now, it is not very surprising that all the nervous filaments going directly to the wounded spot are so affected that the part becomes painful, and is deprived of motion; but the conservative efforts of nature do not stop here. The nerves of each extremity are numerous and leave the spinal marrow at various places, but they are all associated and combined together by means of plexuses; so that in severe injuries to any of their branches, all the various trunks take cognizance of the accident through the agency of their associated filaments, and thus the sensibility and motive power of the whole member become disturbed, so as to secure a desire or a necessity for keeping the whole limb as much at rest as possible; thus indicating the first and most important prescription in every case of local disease or injury.

The train of effects is by no means finished at this point, but we are not yet prepared to pursue it farther. Enough has been said to prove the importance of this first mode of communication between the nerves, and to point out the manner in which nature herself guides the man of science in the study of symptoms and the application of remedies, leaving him scarce any other duty than to second and support her exertions.

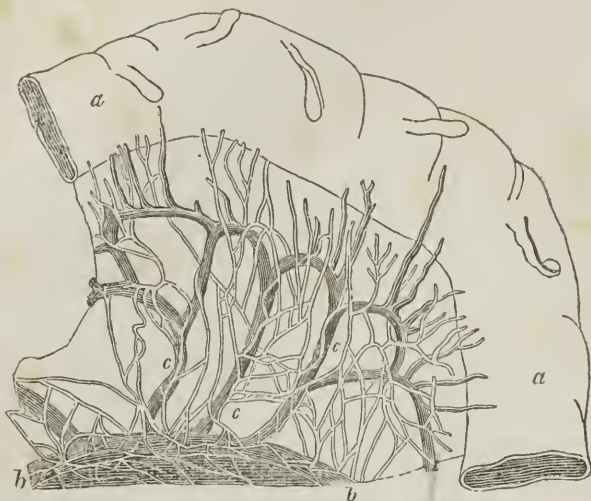
The other mode in which various nerves are associated, is by *ganglions*, which are small masses of nervous matter, interspersed with very loose cellular tissue, and sometimes with animal oil or fat. These ganglions seem to answer the purpose of little brains dispersed throughout the body, and hold-

ing jurisdiction over the operations of certain parts of the system. They possess no consciousness, at least in man. Many of the inferior animals have no other general nervous centres than a few associated ganglions, and display so little intelligence, that they are supposed by many, to be entirely devoid of consciousness or will, we have already stated that these animals are supplied exclusively by the nervous system of organic life. As we ascend in the scale of nature, we meet with animals still devoid of a proper head, but provided with one ganglion much larger than the others, to which they are all subservient. These animals have consciousness, will, and powers of voluntary motion. Their great ganglion has been dignified with the title of Brain, but its intimate structure has never been discovered.

Led on by the analogy between the functions of this great ganglion, and the human brain, many physiologists have regarded the latter as a ganglion also—but the progress of modern anatomy has demonstrated the fact that the human brain is in reality composed of a number of systems of nerves performing various offices, and differing in function only, from the nerves of sensation, motion and organic life. The reason why this arrangement escaped detection for so many ages, was, that the nerves of the brain are not generally collected in bundles; nor are they invested, like the others, in distinct sheaths. They are spread out, so as to form a kind of nervous membrane, which is crowded into the head, like a crumpled handkerchief, and nothing but the most delicate dissection can unravel the confusion. In young children who have dropsy of the brain, the head sometimes increases enormously in size, and this nervous membrane becomes unfolded to a great extent by the water accumulated within it. The child often retains its faculties for a long time, and, after death, the structure above described, is very obvious.

The greater part of the ganglions, properly so called, belong to the nerves of organic life. They are connected together by nervous bands, so that they mutually influence each other. All the nervous fibres from the viscera, or bowels, and those that preside over the circulation, pass directly or indirectly, into one or other of these ganglions, and the fibres which enter the ganglion in this manner, often exceed in number those which connect with its fellows.

Fig. 27.



*a, a.* A portion of intestine.

*b, b.* Part of the aorta or great artery.

*c, c.* Nerves of the intestine, following the course of the branches of the artery.

The connexions of the ganglions of organic life with the nerves of sensation and voluntary motion through the medium of the spinal marrow of which we shall presently speak, in man, are numerous; even the eye is not entirely unconnected with them, and they are slightly associated by two routes with the nerves of the brain itself.

These ganglions have the power of rendering the nerves which centre in them independent, to a greater or less extent, of all other parts of the system; but when acted upon by very powerful causes, they may produce strong impressions upon the nerves of motion or sensation, and even on the brain. Disease of these latter organs may also occasion morbid actions in the ganglions and their nerves, under certain circumstances; thus proving the universal connexion of the various parts of the system with each other. Let us illustrate these facts by examples.

Slight irritations of the intestines often give rise to diarrhœa or to that disturbance of the circulation which is commonly called internal fever, while the mind of the patient continues clear, and he attends to his business without feeling any pain or material uneasiness. In this case the danger is not immi-

nent. Information as to what is going on is conveyed, so to speak, to the ganglions, and nature intrusts the care of the case to them, without alarming the brain and other nerves, because their assistance is not required, and it is unnecessary that the patient should be conscious of the mischief going on within him. If the brain were troubled with messages upon every little accident that occurs in the bowels, the man could hardly digest his dinner in peace!

When the irritation is much more severe or extensive, its effect extends beyond the ganglions, through the medium of their connexions with other parts of the nervous system. Thus, in spasmodic colic, the brain becomes perfectly conscious of the mischief, and the patient suffers so intensely, that he instantly seeks the relief which is so promptly necessary. In spasmodic cholera, which is accompanied by universal irritation of the intestines, violent cramps of the voluntary muscles take place; and in many cases of fever resulting from inflammations of the lining membrane of the stomach or bowels, all the functions both of the mind and body become impaired. Some of the exemplifications of this law are very curious. Thus, an injury to the spine, often occasions palpitation of the heart, and diseases of the heart sometimes occasion all the symptoms of irritation of the spine: a chronic disorder of the stomach may produce total blindness; and the constant motion of surrounding bodies occasions vomiting or sea sickness, by the impression on the eye! With very delicate patients, in fevers, the motion of a rocking-chair in a sick room may endanger life! It is hardly necessary to adduce any more facts in order to show that diseases may prove highly dangerous in some cases before producing serious symptoms, and that the real seat of a disease is often widely removed from the part apparently most affected.

The spinal marrow, of which we have already spoken, is a long mass of nervous matter, like the brain in many respects, which fills the greater part of the canal in the spine or back bone. It seems to be the centre of the nerves of motion and feeling, most of which pass off from it in pains through little holes between the several bones of the spine. These holes are much larger than the nerves, and are filled by soft cellular tissue, &c., which prevents the latter from being crushed or injured by the necessary motions of the bones; but in certain accidents, and in some diseases which occasion a thickening of the soft parts, they are pressed upon, and of course palsied. When the spinal marrow itself is firmly pressed upon, all those parts which are supplied with nerves originating below the injury are more or less completely deprived of motion and sensation; and if the injury takes place high up on the back or



in the neck, the nerves of organic life are disturbed in their operations to such an extent that the patient must die. If the injury is too slight to produce complete palsy, it not unfrequently produces irregular convulsions. When only a part of the thickness of the spinal marrow is injured, there may be a loss of sensation without loss of motion, and vice versa.

Among the lower order of animals which have a regular skeleton, such as the reptiles, the spinal marrow is very large in proportion to the whole mass of nervous matter, because their brains are remarkably small, being suitably adapted to the slender intelligence, or rather instinct, which is sufficient for their wants; but as we ascend in the scale of nature toward animals of more complex organization, we find the brain constantly enlarging its proportions and complexity, until the spinal marrow becomes a subordinate part of the nervous system.

#### OF THE BRAIN.

This grand and all-important organ, to the perfection of which man owes his high ascendancy among the works of God, appears, at first, in the most imperfect animals that possess it, as a mere excrescence or knob on the upper end of the spinal marrow; but becoming continually more and more involved, as the complexity of the animal, and the multitude of his necessities increases, until, in the lord of the creation it constitutes one of the most occult and difficult studies which the mind of man has attempted to grasp. Even the mere arrangement of its parts has escaped for ages the acuteness and the untiring industry of professed anatomists, and vain would be the endeavour to explain to the general reader, even the little now known of its structure and functions. A few broad and bold outlines, such as are absolutely necessary to the completion of this anatomical view, are all that can be attempted here.

When the bony case which contains the brain is laid open, we find it lined, throughout its whole extent, by a strong, thick, pearly, fibrous membrane, which even extends itself into the spinal canal containing the marrow. This membrane adheres strongly to the bones over which it passes, and assists in supplying them with blood vessels. It answers the purposes of an internal periosteum, but as its adhesions are not so firm as those of that membrane when the top of the skull is raised, it is torn loose from the bone, and continues to cover and conceal the brain. It is called, by anatomists, the *Dura Mater*, and is regarded as the outer membrane of the brain.

The inside of the dura mater is lined by another membrane so exceedingly thin and delicate that its existence is difficult to prove, except in certain stages of disease, on which account it is called the arachnoid or spider web membrane. It is reflected from the dura mater so as to cover also the whole surface of the mass of brain, but without descending into all the inequalities of its surface. It enters some of the great fissures of the brain, and lines, also, certain cavities within the substance of the organ.

This is a proper serous membrane, like the pleura in the chest, and the peritoneum in the abdomen, and answers the same purpose, namely, the prevention of friction from the motions of the brain. It is also liable to the same diseases, such as violent inflammation and dropsy.

Immediately beneath the arachnoid, we find another membrane much stronger than that just mentioned, but weaker than the dura mater. This is the pia mater, or proper membrane of the brain, which contains all the blood vessels which go into and return from the substance of the organ. It dips into all the inequalities of the surface, and lines the cavities of the brain, lying under the arachnoid. The violent inflammations of the head, attended with severe fever and delirium, or phrensy, are generally seated in these membranes, and not in the substance of the brain as is commonly supposed.

After the removal of the membranes, the brain itself comes into view. It is a soft mass of gray and white pulpy matter, looking, at first, like a long intestine crowded together upon itself; but the convolutions, as they are called, are not complete: the fissures that separate them are shallow, and below them is found the central white mass of the brain, upon which these convolutions are based.

If the brain be carefully lifted from the head, we shall find it almost divided into two portions, the one small, and marked by very narrow convolutions, lying underneath the hinder part of the other, which is many times larger, and is covered by much broader convolutions.

The first of these portions is called the *cerebellum*, or little brain. It appears before the other portion in the order of formation, and is found in considerable perfection in animals that possess scarcely a trace of the larger and more important portion of the brain.

The cerebellum is so intimately connected with the upper extremity of the spinal marrow, that the former has been regarded by some physiologists as an excrescence upon, or production of, the latter. A great number of nervous fibres from the spinal marrow pass into the cerebellum, and are displayed through its substance, terminating in its convolutions. These

fibres constitute nearly the whole mass of the white or central part of the organ. The reader will not be surprised, then, to hear that the cerebellum exerts a very powerful influence over the functions of sensation and motion, which are the proper functions of the spinal marrow, and the nerves which form it. But as these functions are performed by animals in which the cerebellum can hardly be detected, such as the least perfect reptiles, it follows that this portion of the brain must exercise some office peculiar to itself. Physiological experiments, and the history of disease, sufficiently show that it assists in keeping the power of locomotion under the influence of the will, and that it is the seat of the instinct which tends to the continuation of the species.

The larger portion of the brain, already mentioned, is called the cerebrum, and is the seat of the higher intelligences. It is divided by three deep indentations on its sides and base, and another running lengthwise along its middle line, into six lobes, ranged in order, by pairs, and called the posterior, middle, and anterior lobes. These parts, instead of being simple in character, and all designed to contribute to one purpose, as was formerly supposed, are now known to be composed of a multitude of parts which defy description in a popular work, each designed to fulfil the ends of its own creation. Among the lower orders of the vertebrated animals, the first parts which appear are those that form the back part and the base of the cerebrum, which are supposed by phrenologists to be the seats of those instincts which are necessary to self-defence, the protection of offspring, the procuring of suitable food, &c.; and it is a most curious fact, that the order in which the development of these several parts is observed to take place, as we ascend in the scale of creation, corresponds astonishingly with the habits of the several animals examined. The same remark is true with regard to the order of their growth in man as he advances from infancy to age, changing the form of his brain according to the nature of his necessities, and his relations, and duties in life.

It is only among the more perfect vertebrated animals that we find the middle and anterior lobes of the cerebrum in a state of considerable development; and the superior portions of these lobes are brought to perfection in man alone.

According to the doctrines of the phrenologists, the back part of the posterior lobes of the brain is the seat of those instincts which are necessary to the protection of the offspring during the helplessness of infancy; the lower part of the middle lobes is the seat of those propensities which are absolutely necessary to self-defence, self-support, and the pursuit of prey, namely, the disposition to combat and destroy.

Thus far, the doctrines of phrenology which have produced so much discussion of latter years, may be regarded as fully established; the evidence is too powerful to be resisted, as "he who runs may read." The order in which these portions of the brain are developed, both in ascending the scale of animated nature, and in the growth of the human embryo; their comparative bulk in various animals, answering precisely to the habits of those animals; their actual size in the different sexes and individuals of the same species, corresponding with their different duties and shades of character; the history of insanity and idiocy; and the influence of education and habit on the form of the head, prove, beyond a doubt, the correctness of the doctrine. But the functions of the other portions of the brain, which are either peculiar to man, or are possessed by him in common with but few other animals, are not so easily determined.

As this is no suitable place for discussing in detail the peculiar views of Drs. Gall and Spurzheim, I shall merely remark that according to the doctrines of these philosophers the anterior lobes of the cerebrum are the seat of those organs which the mind employs in perceiving the relations and properties of external things, and in reflecting and reasoning upon them; while the upper portions of the middle lobes are chiefly occupied by the organs of the moral sentiments and feelings.

In offering this extremely imperfect sketch of the groundwork of a much debated science, I do not design to express any opinion, on the manner in which the principles of that science have been carried out in detail, but the few facts which have been stated possess a degree of importance in practice which would have rendered their omission improper; for they illustrate some beautiful positions in hygiene and the treatment of disease, as will be seen in the sequel.

The reader must not suppose, however, that the whole mass of the cerebrum is devoted to the independent and internal actions of the mind. Presiding over, influencing, or determining, as this organ does, the purposes and effects of nearly all the actions performed by the body and its several parts, it necessarily requires a complex apparatus to connect it with the other portions of the nervous system; no inconsiderable part of this apparatus is contained within its substance, and tends to increase its bulk. Like the cerebellum, it receives from the spinal marrow a great number of fibres which spread themselves out and pass on to the convolutions in a similar manner. Other fibres, originating in the convolutions, run in the opposite direction until they are lost in the spinal marrow. From the basis of the brain, the nerves of smell, sight, and



hearing *appear* to pass off, as do also those nerves which give sensation and motion to the head and face; and the system of organic nerves, is also connected with the brain in a manner too complex to be here described. Thus the cerebrum is closely associated with all parts of the animal economy, and the mind, enthroned like a spider in the centre of his web, feels the impulse of every impression made even on the remotest confines of its dominion.

#### ON THE DUPLICATION OF CERTAIN ORGANS.

It is a singular fact, that the organs most essential to the mere existence of an animal;—those, I mean, which are found in all, or nearly all animals, however simple; those which act in a manner independent of the will, and without the individual being conscious of their action—are, for the most part, very irregular in form, *and single*. Thus, man has but one stomach; and in those animals which are provided with more, the different stomachs do not resemble each other, nor do they fulfil the same purposes in the economy of the system: they are, therefore, to be regarded rather as different organs mis-called by the same name, than as duplicates of the same organ. This is true with regard to the ox, and other ruminating animals which have several cavities commonly called stomachs. In nearly all animals, there is but one intestinal canal,—the exceptions to this rule being found only in a few species of marine shell-fish. Man has but one heart, the two sides of which do not resemble each other; his principal blood vessels are single, and, if many of the main corresponding branches passing to or from the opposite sides of the body resemble each other in position, this results rather from the necessary effect of the form of the parts through which they pass, than from their being formed by nature on the same model. Moreover, the resemblance is never very strict, and the distribution of the minute branches becomes exceedingly irregular and uncertain. Parts of this single, or irregular character are called the organs of vegetative or organic life. They fulfil the purposes of digestion, nutrition, respiration, &c.,—functions without which no animal, however simple, can exist. These parts of the body are governed, more immediately, by the nerves of organic life, which have been noticed already.

But, on the contrary, those parts of the more perfect animals, which place them in connexion with surrounding things, which are under the government of the will, or contribute to the perfection of the external senses, are always arranged in pairs; the organs being almost exactly similar on the opposite

sides of the body. Thus, man has two arms, and two legs, similar, each to each. All the organs of his external senses are, in like manner, double, even to the nose, which, though apparently single, is composed of two nostrils, alike, or very nearly alike, in all respects. These duplicate parts are called the organs of animal life, and are under the government of the nerves of animal life, or, as it is sometimes called, the life of relation.

There are other parts of the body, of a mixed character, being partly under the influence of the will, and partly independent of it, such as the ribs and muscles of respiration, &c.; and these parts, though double, are less symmetrical and more subject to variety of form, than those which appertain exclusively to the life of relation.

All parts of the brain are double; hence, the organs of thought and of instinct are precisely alike on both sides of the head, excepting in cases of individual or hereditary disease, and if a portion of one side of the brain be injured or removed, it is possible for the other side to execute all the mental operations; as a man may continue, after the destruction of one eye, to see accurately with the other. But as a man sees but one image of an object, although that object is painted on the retina of each of his eyes, so his mind performs but one operation at a time, although both sides of the brain may be called into action. Now, in order that the opposite portions of the brain may always act in concert, and thus prevent confusion, there are several bundles of nervous fibres within its substance that pass from one side to the other, connecting the corresponding parts with each other, and answering no other purpose than to produce this consentaneous action. These connexions are called the commissures of the brain. It is probably in part owing to a similar connexion known to exist between the optic nerves, that we see but one image with both eyes, and that when only one eye is injured, both are so very liable to inflame at the same time.

It would verge perhaps on the ridiculous, if we were to carry our analogy farther, and conclude that because the eyes perceive two images of the same object in squinting, that certain instances of *mental obliquity* might be accounted for, upon the same principle; but, jesting aside, there are certain mental phenomena displayed occasionally in disease, that render it at least probable that the two sides of the brain are capable, under certain circumstances, of acting independently, and in a manner different from each other. The writer of these pages formerly had the pleasure of a personal acquaintance with a lady whose case, at one time, attracted very ge-

neral attention, having been made public by the late Dr. Mitchell, of New York.

She became subject to convulsions, after having arrived at mature age, and after the first attack had passed over, she was found completely ignorant even of the alphabet, and it became necessary to teach her like a child. Her progress, however, was very rapid, and she soon acquired the command of language, but her memory of past events was so completely lost, that she read her bible with all the zest of novelty, and was exposed to danger on several occasions, from her want of knowledge of the habits of animals, and the properties of things, with which she had been familiar from infancy.\* Her fits returned at long and increasing intervals, and after each attack she remembered every thing that she had known at the time of the preceding paroxysm, but was totally unconscious of any occurrence that took place during the last interval. Thus she appeared to possess two sets of ideas, which intermitted with each other, and so complete were these changes, that she might almost be said to have two individualities! When in one condition, she was always seriously inclined, somewhat taciturn, and disposed to melancholy; in the other, she was loquacious, was lively, wrote poetry, was given to reparté, and read novels with avidity. In both states, she was decidedly intelligent, and became accomplished, without displaying any traits that would have led a stranger to suspect aberration of mind.

Many cases of this character are on record, and some of them are too well authenticated to admit of doubt.

It is not pretended that these instances furnish positive proof of the occasional independent action of the two sides of the brain, for they may be explained, though not so simply, upon other principles. They are noticed here, as strongly illustrative of the complexity and mysterious character of that machine, with which ignorance and empiricism have the audacity to tamper so often and so rashly.

There is one circumstance connected with the duplicate character of the brain, which it is highly important to mention.

The fibres which have been already described, as connecting the cerebrum with the spinal marrow, run across each other near the place where they join the latter organ, so that those which pass to or from the left side of the cerebrum, go

\* She once seized a large rattlesnake by the tail, as it was entering a hole in the ground, and owed her life to the strength of her intended prey and the slipperiness of its integuments.

to the right side of the spinal marrow, while those on the right side of the former are connected with the left side of the latter. This arrangement accounts for the remarkable fact that, in fractures, or other severe injuries on one side of the head which produce palsy or convulsions, these symptoms generally occur on the opposite side of the body. When palsy, or convulsions are confined to the same side with the injury, it is rendered probable, (though perhaps not certain,) that the cerebellum, or some of the parts near the summit of the spinal marrow are wounded, and that the cerebrum has escaped.

Here we will leave the subject of anatomy, after having completed such an outline as is fitted to amuse and instruct the general reader. We may find it necessary, as we advance in the work, to give some farther details with regard to particular organs; but when this is the case, the anatomical descriptions will be found prefixed to the chapters, or sections, which treat of the diseases of those organs.



## CHAPTER III.

## PHYSIOLOGICAL REMARKS.

IF it be difficult to convey to the general reader any thing like a complete notion of the structure of the human body, it is still more difficult to communicate a knowledge of its various actions. Hence, if we have been compelled to be very general in our anatomical remarks, we are under still stronger compulsion to limit our range in the field of Physiology. Pursuing, then, the plan of teaching already adopted in this work, we shall confine ourselves to the consideration of such points only, as are both necessary to our future design, and intelligible to unprofessional readers; beginning with the most simple ideas, and gradually enlarging the field of view as we ascend to more complex operations.

Physiology is the science of life, and treats of the operations and actions performed by living bodies when in a state of health. It has been customary to give a different name to the science that treats of the same actions when in a state of disease, which is called Pathology: but these branches are as intimately connected with each other as is the art of making a watch, with the art of keeping it in order. However convenient such a division of the subject may be for those whose lives are spent in the prosecution of such studies, it is too artificial for our present purposes, and we shall disregard the distinction in the few remarks which follow.

## OF ASSIMILATION AND NUTRITION.

In the section of the last chapter, some idea of the mechanical process of nutrition was attempted to be given, but nothing was said of the power by which an animal body selects, from the food taken into the stomach, or from the medium by which it is surrounded, such particles only, as are necessary to support the body, or the various organs which it

contains, while it rejects those particles which are noxious or useless. Of this power we propose to speak at present.

We have already spoken of that singular property by which animal membranes, such as strips of bladder, mucous membrane, &c., are enabled to pass certain fluids through their substance in preference to other fluids; and it has been shown that the substances thus transmitted, are not always those which escape most rapidly when exposed to the air, or left in a vessel unconfined. The experiments of Dutrochet, Faraday, Mitchell, Rodgers, and others, have proved that the same power exists in all animal, and probably, in all organized membranes after death, and a multitude of facts in the physiological history of man and animals, might be adduced to show that similar operations are constantly taking place in the living body.

But there is a still more curious and important truth connected with this subject. The same membrane will transmit one substance with facility in one direction, while another can only pass with freedom in the opposite direction!

Now, although both living and dead matter possesses this power, there are many circumstances in the history of disease and death, which prove that the vital principle exerts a controlling influence over its displays. Thus, the colouring matter of the bile appears to be retained entirely in the gall bladder during health, and in bodies examined a few hours after accidental death, we generally find the outside of that receptacle of a natural colour with an unstained pearly surface; but in persons who have been destroyed by hepatic complaints, and those who have been dead for a considerable time, this surface, together with the neighbouring bowels, are often found deeply imbued with the yellow or brown colour of the bile. Many other facts of a similar nature might be mentioned, but it is sufficient for our present purpose to mention one of them, which comes continually under the observation of every anatomist. It has been mentioned, in the appropriate section, that the cuticle, (see page 107,) which covers the whole external surface of the body, is altogether divested of openings or passages, and that the belief in the existence of pores in the skin, is an error. This belief has resulted from the appearance of the membrane, where its lines or grooves intersect each other, and where the hairs are implanted. The inference, that passages exist, drawn from seeing the skin bedewed with large and scattered drops of sweat, is equally unfounded, for this appearance is at once explained by the power of which we have been speaking, as resident in all animal membranes. It is now no longer doubtful that the skin transmits outwardly *through its substance* not only the vapour of the insensible perspiration, but the fluid which bathes

the whole surface during violent exertion, or exposure to the heats of summer, together with the salts well known to be contained in this secretion. It is also known that the same skin is capable of transmitting, inwardly, certain substances which are applied upon its outer side, and this is done, without the aid of any vessels, by a vital power residing in the membrane itself, altogether different from capillary attraction, or that power by which unorganized and spongy bodies imbibe a fluid which is placed in contact with them. That this property of membrane is a vital and not a mechanical one, is proved by the fact that it is diminished or arrested in certain stages of disease, as, for instance, in the hot stage of certain fevers, when the supply of blood to the surface is even greater than usual—while it is increased a hundred fold in other maladies, such as malignant cholera, when the external circulation is almost destroyed! The very recent experiments of Dr. Rodgers on this subject, (*American Journal of Medical Sciences*, August, 1836,) appear like the dawning of a new morning over the darkest regions of Physiology.

Now, although the mucous membranes of the alimentary canal are believed to be deprived of cuticle throughout nearly their whole extent, yet it does not follow that the extremities of the lacteals, or other vessels, which take up the nutritious particles of the food from the surface of these membranes, are open, or that they ever reach quite to the cavity of the bowels. Anatomists have never demonstrated the existence of any connexion between the vessels and the surface, in any part of the body, although our coloured injections of the blood vessels are often carried to such a degree of minuteness that the fluid employed flows into the intestines and fills them,—leaving the colouring matter behind, in the vessels. But this result, as well as the secretions of the bowels, and the absorption of the nourishment of the system, may all be accounted for on the principle already laid down; by which living membranes transmit through their own substance, in opposite directions, the various substances which nature designs to employ in, or reject from the system.

Among the simplest animals, which are not provided with nerves or blood vessels, and in which, if they have cavities, the inner and outer surfaces are apparently alike, the whole process of assimilation appears to be perfected by the external membrane or tissue, without any other aid; but in the complex animals and man, though the inherent powers of the tissue still remain, the process of assimilation cannot be completed in this simple manner. The chyle taken up by the lymphatics, is not blood, though it is evidently an organized fluid: it must pass through the lungs before it becomes fitted to nourish the

system. The lungs in man, then, assist in this process. The blood is not muscle, though the fibres of muscles are formed from the materials which are supplied from the blood by secretion, and the same remark is true of all the various organs of which the body is composed, and consequently, the process of secretion is but a particular form of assimilation.

The same arguments which show that the reception of nourishment into the system is, in all probability, the transmitting power of the membranes—and chiefly, of the mucous membranes—tend with equal force to prove that the secretion of the materials of the different organs, or, in other words, *organic nutrition*, is also the result of the same power. The vessels which supply the several organs of the body have never been *proved* to terminate with open mouths, nor has it been shown that they are porous—and although many medical doctrines have been based upon the supposition that they are constructed with one or other of these species of orifices—the idea is purely hypothetical. It amounts to no more than a *guess*, or if supported by seeming facts, these are the result of microscopic observations of a very questionable character. On the other hand, the doctrine which attributes the nutrition of the organs to the transmitting power of the membranes which form the coats of the vessels, and enclose the particles of the organs and tissues, (see page 126,) stands upon facts of greater weight, because they can be observed on a greater scale.

In the present state of our knowledge, then, it is more correct to consider the first and last steps of nutrition, as well as the formation of secretions as phenomena, characteristic of the vital organization of tissues, and not produced, as is still generally believed, by the blood vessels themselves.

These remarks may appear to contradict the opinion defended in the first chapter of this work, where it is urged that the cellular tissue is the fundamental tissue, by which all parts of the body are formed, and in which their particles are deposited; for, it will be asked, if there is but one fundamental membrane in the body, and if all the other tissues are composed of this, and certain matters thrown down into its cells; and if it be true that absorption and secretion are the result of a property inherent in the membrane, how can it happen that all parts of the body do not absorb and secrete in the same manner? The answer is a plain one. The interstitial deposits do certainly modify the vital powers of the organs or compound tissues into the formation of which they enter. They are new agents in the vital chemistry of the parts; and it would be as unreasonableness to suppose that cellular tissue complicated with bone or muscular matter, would produce precisely the



same action with cellular tissue in a free state, as to suppose that sulphuric acid combined with lime or potash, would act in the same manner with sulphuric acid when in its pure or isolated condition. The experiments of Dr. Rodgers sufficiently prove that the transmitting powers of the peritoneum, the mucous membrane, the substance of the liver, and the bladder are widely different from each other, while they are sufficiently energetic to effect the decomposition of metallic salts even after the tissues have lost their vitality! When it is recollected, in addition to these facts, that in the more complex animals, the nerves exert an important influence in modifying, according to circumstances, the vital properties of the parts to which they are distributed, it cannot appear surprising that we should witness such various effects in different portions of the body, from the operations of assimilation and nutrition.

But, in the former chapters of this work we have spoken of the capillaries as active agents in the two intimately associated processes just mentioned; and this may lead the reader to tax us with inconsistency, in attributing such extensive powers to the tissues themselves. Let us, then, explain the agency of the blood vessels, in the support of the principal functions of organic life.

The blood vessels are the conduits which convey the fluids that have undergone that process of assimilation which fits them for nourishing the several organs of the body, to the parts where they are required. They also convey those matters which have ceased to be useful, to the different apparatus designed to discharge them from the system. The capillaries, by means of their strong fibrous coats, and their capability of dilating or contracting extensively, determine, in great degree, the quantity of blood directed to any particular part, and the rapidity of its motion when there. So long as a part remains healthy, it is a general rule that the greater the amount of blood which passes through it in a given time, the more active are its functions; but the reverse of this is often observed in disease, for the excessive and rapid supply of blood will sometimes arrest the functions, as has been remarked of the skin in the hot stage of some fevers, and an extreme slowness of the circulation sometimes appears to favour certain secretions; which fact, as we have already mentioned, may be observed in the skin and mucous membranes during the malignant cholera. The power of the capillaries in regulating the circulation, is much influenced by the nerves, which thus exert an indirect influence over the processes of assimilation and nutrition not less important than their direct effect on the vital properties of the tissues.

But the nerves themselves depend upon the capillaries for the preservation of their own functions. If they are supplied freely with blood, they act with energy, and under other circumstances they *generally* become debilitated, and nutrition is carried on with greater or less facility, according to the condition of the nerves of the part.

Again, if the quality of the blood be vitiated, as it may be by improper diet and other causes, both the nerves and the other tissues must suffer for the want of their proper stimulus, and the materials for their support, and assimilation and nutrition must necessarily become disordered.

It appears, then, that the processes of assimilation and nutrition, the most important functions of the animal organization, depend upon four principal circumstances:—1st, the condition of the membrane; 2d, the proper composition of the blood; 3d, the action of the blood vessels—and 4th, the influence of the nerves. The disorder of either of these circumstances is sufficient to induce disease; and as they are all by nature mutually dependent on each other, it follows that neither of them can be disturbed without affecting all the others. It is often impossible to determine where the first link in the chain of morbid action is located; and it is sometimes equally difficult to discover the starting point in the train of causes which produce disease. Witness the history of epidemics and hereditary affections,—the former resulting from some wide-spreading physical influence, perhaps—like the secret agents which engender cholera and influenza—co-extensive with the whole globe: the latter, consequent upon the misfortunes, and it may be, the crimes of our progenitors!

It has been customary for the unprofessional public to smile at the science of medicine, because its teachers and distinguished fellows have differed widely from each other in their theoretical opinions; but it should be remembered that short of the dogmas of revealed religion, there are no indisputable truths but those of well demonstrated mathematical propositions.

The doctrine of gravitation, by means of which the science of mechanics has been brought to its present high perfection, is founded upon a mere hypothesis—a word of eleven letters used to express what none can comprehend! Eclipses were calculated long before the days of Newton by those who thought the sun moved while the earth stood still, and whose descendants now believe the world to be a plane!

No one will pretend that the theories of Newton have not been of incalculable advantage in the application of science to the practical affairs of life; yet they do not explain the first cause of any planetary movement—and already the progress of the chemistry of imponderable fluids begins to threaten the

foundations of his system. Its just conclusions, indeed, cannot be overthrown, for they rest upon innumerable observations. Just so, the various medical theories which have chased each other rapidly into oblivion from the times of HIPPOCRATES to those of BROUSSAIS—though all are partial and imperfect—have tended, each in turn, to advance the science and give birth to ideas more and more important and correct.\* They are like so many steps or terraces upon the mountain of science, whose summit, illuminated by the clear rays of truth, is wisely placed above the region of the clouds, unattainable in this state of existence.

The chief cause of the diversity of medical theories has been the habit of attributing the phenomena of the disease to a disorder in only one or two of the four circumstances enumerated as influencing the processes of assimilation and nutrition, to the neglect of the others. Thus, the *solidists* accounted for all morbid actions by attributing them to changes in the condition of the tissues, forgetful of the obvious fact that those very changes are the result of *previous disease*, and, therefore, cannot be regarded as a safe starting point in medical reasonings, though they furnish satisfactory explanations of many important symptoms.

The *humoralists*, on the contrary, referred every thing to the condition of the fluids, unmindful of the fact that these very fluids are formed by the action of the solids upon external matter. The followers of CULLEN directed their attention chiefly to the condition of the capillaries and the nerves, to the exclusion of the blood and the other tissues. Waving the less detailed doctrines of BROWN and RUSH, the theory of BROUSSAIS carries generalization to a greater extent than any of its predecessors; but it was scarcely matured, before many facts were accumulated which could not be embraced within its limits!

In the midst of all these revolutions of opinion, the science has been steadily advancing, and continually arranging in systematic manner, a larger and larger circle of facts. We are

---

\* We must refuse this praise to some of those wild dreams which now agitate the public mind—such as that German doctrine which teaches that *the half is greater than the whole!* and that the best mode of rendering a disease better is *to make it a little worse!*—the still less rational position of those who hold, that because mineral medicines *are sometimes poisonous*, we should confine our treatment to the use of vegetables and “*herbs*,” which *are often much more poisonous!*—and the opinions of those who think that “*life is fire!*”—and, like the Ghebers of old, worship its personifications in *cayenne pepper* and the *hot bath!* These may be classed with the fancies of Paracelsus, when that great reformer “*drew upon his imagination for his facts.*” These doctrines are *intangible*, and the medical profession has no *pecuniary interest* in opposing their ascendancy, for they certainly do not diminish its emoluments.

still far from the comprehension of first causes in Physiology; but those who tax the profession with empiricism, in consequence of the apparent contradiction between contending opinions on medical theory, betray a partiality and narrowness of judgment. All the doctrines noticed are true to a certain extent, and all have contributed their share in promoting the application of truth to practice. Even when they sink beneath the scythe of Time, their influence continues to add strength to those which rise upon their ruins, as the decaying tree gives richness to the soil from which the stem of its successor draws its nutriment.

As the processes of assimilation and nutrition, viewed in the very extensive sense which we have given them, include, directly or indirectly, all the *organic functions* of an animal, their disorders embrace the whole field of morbid action, or disease, so far as it results from the operation of external causes. The nature of life itself, and of the nervous influence, like gravitation, chemical reaction, and all other first causes in philosophy, is placed beyond the limits of our knowledge, and though there is much in the history of epidemics and hereditary disease, which tends to prove that these causes themselves are altered in their action by changes in the organization of the individual, or by atmospheric influences, it is at present in vain to argue upon the modifications of disease which probably result from these alterations. In this department of our science, the duty of the physician is now, and in all probability will for ages continue to be the accurate observation and careful record of isolated facts.

#### OF THE REPRODUCTION OF PARTS, AS DISPLAYED IN THE HEALING OF WOUNDS.

The mechanism of nutrition in the first production of the human body, is a subject involved in extreme obscurity and difficulty; nor is it at all adapted to the character of a popular work. But, in the history of the healing of wounds, we are able to perceive, more clearly, the mode in which nature produces the several organs of the body, by means of close observation on her mode of operating in the reproduction of parts of the body which have been divided or removed by accident.

When a clean cut has been made by a sharp instrument, in a part which contains no very large blood vessels, it is observed that the nerves of the part are stimulated; or, in other words, the patient suffers pain, if the wound occur in any organ supplied with nerves of sensation. Very soon after this



moment, the capillary vessels of the part are found enlarged, and more blood is admitted into the neighbourhood of the injury than is usually found there. This proves that the circular or muscular fibres of the capillaries have been relaxed, and that the vessels are increased in size. As an inevitable consequence, the colour of the part is heightened, and so long as the process is consistent with health, the functions of the part are increased in rapidity, its hue approaches to that of arterial blood, its sensibility is increased, its temperature is elevated above the customary standard, and the part is in some degree swelled or enlarged. This condition has been erroneously designated by a term which is invariably associated with the idea of local disease. This term is *inflammation*.

Inflammation is described to be a state of any particular part of the body, characterized by an increase of heat, redness, swelling, (i. e. fulness,) and pain, (i. e. sensibility.) A better description of high health could hardly be given! If we compare the young child with the adult man, we find him distinguished by a comparatively greater amount of *heat, redness, fulness, and sensibility!*—that is, he labours under *universal inflammation!* If we were to examine the fœtus before birth, it would be found possessed of these same characteristics in a still greater degree, if the term sensibility be extended to the perceptions of the nerves of organic life! After a hearty meal it is well known that the heat, redness, fulness, and sensibility of the stomach are decidedly increased—and this increase is carried so far that symptoms analogous to a slight chill and fever are the natural consequence. In the terms of the definition, then, it would be perfectly logical to say that, after dinner, a man labours under *inflammation of the stomach*—a very serious disease called *gastritis* by physicians!

The very close analogy between the healthful operations of the body in restoring wounded parts, and the phenomena of actions universally acknowledged to be morbid, has led many professional writers to the adoption of the term “healthy inflammation” to signify the former class of vital effects. But the employment of the same name to designate states, both of health and disease, is calculated to produce endless and inextricable confusion in the minds of those who seek information in the science without the means and leisure to become profound. I shall, therefore, reject the term inflammation in the present work, while speaking of the healthful process by which parts are reproduced, reserving it as a title for certain morbid trains of symptoms which will be described hereafter.

In perfectly simple cuts, occurring in healthy individuals, the process of restoration is exceedingly easy, provided the

cut surfaces be kept accurately in contact with each other by mechanical means. The vital actions of the part being rendered more active in the manner already described, the wounded cellular tissue pours out a glutinous fluid analogous in appearance to that which fills the cells of the fœtus at a very early stage of growth, and that which is found in the structure of the simplest animals. This fluid gradually hardens, binding the cut surfaces together, until, in a few hours, it becomes a part of the cellular tissue, and soon afterwards, minute branches of blood vessels from the neighbouring trunks are found to have penetrated it in all directions, so as to constitute it regularly a portion of the living body. If the health and constitution of the patient be good, this process is effected promptly, and without accident. Hence the extreme folly of those nostrums which are so often administered in "fresh cuts," and which are so exceedingly prone to produce the very mischief they are applied to prevent. A *fresh cut* requires no other precaution, after the bleeding is checked and the wound cleaned, except that its edges should be kept in contact as nearly as possible, and the external air excluded as completely as convenience will permit. If the patient be very weak, or unusually excited, the part may become diseased and may then require other treatment; but these conditions will be considered hereafter.

When a compound organ, such as a bone, muscle, or nerve, is divided by the cutting weapon, the union is effected in the same manner; but a very long time elapses, after the union is effected by the cellular tissue, before the peculiar interstitial deposits which form the organ are thrown out in such a manner as to restore its proper functions. In a muscular part, this result is not completed for many weeks; in a bone, it occupies some months; and in a nerve, several years elapse before it is entirely finished. Even the brain itself has been known to unite in this manner after a wound; but this effect is accomplished with so much difficulty, that the number of instances on record are very few. It would appear, therefore, that the later an organ is produced, in ascending the scale of nature, the more difficult is its reproduction. Man, like a zoophyte, can renew a portion of cellular tissue with ease, but as this tissue forms nearly the whole organization of the latter, if it be cut in half, each piece forms itself into a perfect animal; while in man, the complexity of the organs renders their renewal difficult long after the union of the tissue in which they are imbedded.

If the wound inflicted should occasion a loss of any portion of the solid substance of the part on which it is inflicted, nature apparently pursues a very different course in effecting a

cure, but it is in reality the same in principle. In this case, the sides of the wound cannot be kept in contact by mechanical means, but continue gaping, and more or less exposed to the external air. If the wound be small and the part remain entirely uncovered, the glutinous fluid which has been already mentioned, gradually fills the vacancy, and often rises far above it, becoming dried by the air, and converted into a scab, beneath which the union makes regular progress without any change in the secretions of the part. This mode of cure by scabbing is often the best which can be accomplished by the surgeon, who should encourage it whenever circumstances permit. The greatest inconvenience attendant upon it results from the hardness of the scab and its disposition to contract, so as to irritate the surrounding parts; but this can be generally relieved by touching it with oil, or by frequent bathing.

But when the wound is large, or when it is dressed, from the first, with an ointment, it will not form a scab; and the surface of the cellular tissue of the wound secretes a new membranous covering, probably formed by the glutinous exudation already mentioned. This membrane soon becomes organized and begins to secrete matter, or *pus*, which keeps the wound continually moist, and prevents the irritation which would otherwise inevitably result from the drying effect of the air.

While the pus is forming and flowing from the wound, the membrane and the surrounding parts are becoming continually more and more vascular, until the wound is rendered intensely red; and, in the mean time, the cells of the cellular tissue are distended with an increased serous or other deposit, so that they swell up more and more, and the whole surface is covered with little conical eminences, resembling flesh, called granulations, which shoot from all points toward the centre of the wound and the surface of the skin, and wherever the sides or summits of these eminences come in contact with each other, they unite and close that part of the wound, thrusting up before them the membrane which secretes the pus, until at length it is raised nearly to the level of the skin. The membrane then becomes thickened; a great deal of fibrous matter is deposited in it, the secretion of pus ceases, the heat and redness decline gradually, and it dries,—assuming the characters of an irregular skin. The wound is then said to be healed or *cicatrized*.

After this is accomplished, the absorbents remove the unusual deposits of fluids from the cellular tissue, and also from the substance of the scar, which contracts powerfully, but always remains irregular in form, and more liable to disease than the original structure. With this contraction and absorption, the swelling disappears, and the cure is complete.

This process is always much slower when more solid parts are wounded, for then it is often necessary that the absorbents should take away the interstitial deposits of the organ before the cellular tissue can be left free to swell and form granulations to close the wound,—or, the neighbouring tissues must enlarge to a greater extent, and pour into their cells matters not designed by nature to appear in such situations. This difficulty is remarkably evident in cases of compound fractures, where an external wound communicates with the cavity of a broken bone.

Internal wounds heal in the same manner with external ones, but the process is then concealed from view. When the wound is simple, and the parts around it are not too much weakened by the accident to pursue a healthy course, the blood which fills up the intervals between its sides, and prevents them from closing, it is generally absorbed, and finally disappears so as to permit the sides to unite without the formation of any pus: but if the quantity of blood be very great, it becomes altered in character, and irritates the wound to such a degree that pus is secreted, and the case converted into an abscess.

Even after this, the fluid may be absorbed by degrees, and the wound may heal by internal granulations, but far more frequently, nature converts it into an external wound, by an absorption of that side of the abscess which happens to lie next the surface, sometimes, even while granulations are actually growing on the deeper side; and the abscess at length makes its way through the skin, pours out its contents, and heals in the manner already described.

It is not by any means necessary that a part should be positively wounded, in order that all the phenomena of heat, redness, swelling and pain should make their appearance, and that the part affected should undergo something like a reproduction. Let us suppose, for instance, that a mechanical injury has been inflicted by a blow without a wound. The part takes on the same kind of action; there is more blood sent toward the part than usual, its sensibility is increased, &c.; and if any particles or atoms are rendered unfit for service by the injury, they are taken up into the absorbents, and others are deposited in their place, from the capillaries, without the occurrence of a rupture.

If the injury be still slighter, the same symptoms occur, but they are evanescent. No change of structure takes place in the part, but its functions are for the moment increased in activity, and then every thing returns to its natural condition, as from a false alarm.

None of these phenomena are inconsistent with health. They



do not constitute disease, but are mere exemplifications of the process of nutrition, by which the body was originally formed, and by which its waste and injuries must be repaired. When any disturbance takes place in the order or degree in which these symptoms appear, then indeed *we have disease*, and among the most important of these disturbances we may class *inflammation*, which will be treated of hereafter.

#### OF SYMPTOMATIC FEVER.

Even where a local injury has been slight, it produces, through the medium of the nerves, effects upon the nervous centre most closely connected with the part. An increase of vital energy, and a larger supply of blood being indispensable for the repair of the injured organ, the heart is called into unusual activity, and the circulation is hurried, the capillaries give passage to more blood in a given time, the animal heat is increased, and all the vital functions are carried on with unusual vigour for a time, while the irritated point still holds the ascendant over other parts of the system in vital activity. After a short time, however, this unusual energy declines, from the exhaustion of the over-wrought organs, or the subsidence of the local irritation.

It matters not whether the part injured be internal or external, nor whether the mischief be produced by a mechanical cause, by a change in the quality of the circulating fluids, or by some momentary derangement in the action of the nerves of the part, occasioning an irritation there: the same train of symptoms occurs under all these circumstances, and gives us an example of the mildest form of *Reaction* or *Symptomatic Fever*. Still, the condition of the part, and that of the system in general, is such that nature requires no aid from art, and the patient can scarcely be regarded as having passed the barriers of health.

But let the injury be a little more severe, and then *disease*, either local or general, or both, is fairly established. The part affected is weakened to such a degree, either by the direct effects of the cause of injury, or by exhaustion from the excess of its own action, that its vessels are no longer capable of bearing up against the force of the general circulation; and although they may still permit an unusual quantity of blood to flow through them, this is accomplished by their passive enlargement, and they no longer react properly upon their contents. The current of the blood becomes less rapid, the vessels are more and more stretched and weakened, the colour becomes deeper or more purple, and at length the fluids may be

reduced almost to a state of stagnation. In the mean while, preparations for the removal and reproduction of the injured part may still be carried on, though laboriously and imperfectly, because of its unhealthy condition. This is a picture of *local inflammation*.

Two important consequences generally follow from this state of things. 1st. The overloaded vessels, unable to propel their contents, commonly relieve themselves by effusion; that is, they pour out, either on the surface or within the substance of the part, the serum of the blood, as in blisters,—or pus, as in abscess. 2d. The distention of the vessels becomes itself a source of irritation to surrounding parts, and thus extends the injury and the disease:—while nature, on the other hand, in patients of healthy constitutions, as constantly endeavours to arrest the progress by causing an adhesion of the cells of the cellular tissue all around the inflamed parts, so as to isolate them from the rest of the body; and when this purpose fails, the consequences are often dreadful.

These facts explain the appearance so commonly noticed in most local inflammations that are not cured in their earlier stages—appearances often beautifully exemplified in a common bile. The centre of the tumour is found soft and compressible, being converted into a regular abscess. The parts immediately around the cyst containing the pus are of a dark purple colour, from the stagnation of the blood in the vessels;—the rest of the swelling is of a bright red hue, and its temperature is elevated far above the natural standard—while round the margin, the cells of the cellular tissue are obliterated by adhesion, and the spreading of the inflammation is prevented.

The reader has now received some idea of the purely local effects of injuries when not carried to such an extent as to destroy the energies of the part, and produce its immediate or very speedy death by gangrene or mortification. But there are a series of consecutive consequences which require more especial notice, and by a proper explanation of these we shall best convey some idea of the nature of that extensive disease which causes directly or indirectly a large majority of all the deaths which load the bills of mortality—**FEVER**—a word on which innumerable volumes have been written, and innumerable lectures delivered, causing violent altercations both in and out of the profession. It does not admit of a simple definition, but must be understood from its general history.

When a local injury is both severe and extensive, the impression upon the nervous system, in general, is such that its energies are depressed on the instant; for no organ or system in the body can endure an exceedingly powerful impression without temporary depression from the overwhelming

demands made upon it. In consequence of this depression, the patient is rendered languid. The blood leaves the surface of the body and retires to the vital organs in the interior, embarrassing them by its quantity. The heart shares in the general depression, and struggles feebly to continue the circulation. If this state of things be carried very far, the patient is said to be in **COLLAPSE**.

More or less disposition to collapse is observable in the commencement of nearly every case of fever, and if carried beyond a certain point, the vital organs are paralyzed, and the patient generally dies in a few hours—as often happens in the Asiatic cholera, and sometimes in malignant intermittent fevers;—but otherwise, it seldom continues long. The nerves appear to be accumulating power during this short period of repose; and, before long, reaction, or symptomatic fever, makes its appearance. The heart acts with continually increasing energy, driving the blood in a very rapid torrent through the arteries.

Still, the injured part itself, demands and receives the greatest supply of nervous energy and the largest amount of blood, for it is there that nature is compelled to resist or repair the threatened mischief. This part, already weakened to a degree which makes the pressure of even a healthy circulation dangerous to its integrity, suffers incalculably more under this violent reaction of the system. Hence the necessity of depleting measures, such as bleeding, cold effusions, &c., in cases of high inflammatory fever in its first stage.

But it is a law of the animal economy, as we have had occasion to mention in the earlier part of the work, that whenever an organ is called upon for unusual exertion, it afterwards sinks into a state of exhaustion; or its vital powers are diminished. This state of things, as it appears in the injured part, has been already pointed out, but its influence on the system, generally, remains to be explained.

When the principal blood vessels, and the heart itself become fatigued to a certain degree, the paroxysm of fever declines: but if the local irritation continues the same, or when it gradually increases in violence, the heart and vessels, after a temporary and partial rest, are stimulated to renew their efforts, and this alternation may be continued from day to day, while the patient improves, or becomes worse, in proportion to the relative length and intensity of the *remissions* and *exacerbations*. Here, then, we have explained the phenomena of a *remittent fever*, and indeed, all fevers are more or less remittent.

It has been stated that in order to produce reaction, or symptomatic fever, it is necessary that the local irritation

should be of sufficient extent and severity. Now, the part affected with inflammation is liable to the same alternations of increased excitement and exhaustion that mark the progress of a general fever; for inflammation is but a kind of local fever, and of course it is subject to its remissions. When the remission of the local symptoms is so complete that the irritation falls below that standard of violence which is necessary to produce reaction, the symptomatic fever must cease; but it will be renewed again as soon as the local exacerbation reaches the requisite degree of intensity. It is obvious, that, under such circumstances, we should have an *intermittent fever*.

All the three forms of fever, or types, namely, the continued, the remittent, and the intermittent, are occasionally seen as consequences of simple mechanical injuries, and the reigning doctrine of the day, (*the Broussaisian*,) attributes, very correctly, all fevers to some local irritation. It was formerly customary with *nosologists*, (that is, those who divide diseases into orders, genera, and species, like objects of Natural History,) to range fevers under two distinct orders, the idiopathic, or self-created, and the symptomatic, or consecutive fevers.

This distinction is now very generally discarded, and we think with perfect propriety; for in the train of symptoms which mark the approach and the attack of fever, there is always found some local inflammation, or some irritation of sufficient extent or violence, to deserve that name; and this local affection invariably precedes the reaction. It is rarely possible, in the present state of our knowledge, to penetrate farther back than this primary local affection in studying the history of fevers, and it is therefore styled *the cause*, or *the proximate cause* of fever. In that sense we shall employ these terms in our future remarks in the progress of this work.

The proximate cause of fever is generally the result of some accident, such as a blow or fall, improper diet, exposures to changes of climate, an irregularity in the functions of some nerve produced by some known or unknown causes, the absorption and introduction into the circulation of some poison, the inhalation of noxious vapours, &c. &c. These are called *exciting causes*.

There are peculiarities of certain individuals, the result of accident, hereditary tendencies, &c., which prevent them from experiencing the same effect which most persons suffer from the action of the same causes of disease. These peculiarities are commonly styled *constitutional*, and are designated among medical men by the terms *temperament*, *diathesis*, *idiosyncrasy*, &c.,—hard names that we shall not even attempt to explain,—for this work is not intended for those who wish to



study the science in all its elaborate details. Again, there are certain atmospheric or other occult influences which modify the character of fevers in different places, years, and seasons. Thus, the same imprudence in eating, which in one year produces a *bilious fever*, shall, in another, bring on a *yellow fever*; in a third, *malignant cholera*; in a fourth, a *spotted fever*, &c. &c. Causes of this description are entitled *predisposing causes*.

The same changes produced in the characters of fever by the various predisposing causes, are equally obvious in the history of local inflammations. Thus, an amputated limb shall recover without difficulty, and very promptly at the Pennsylvania Hospital, in Philadelphia, while at St. Thomas's, in London, it shall bring on an erysipelas of the member; and at the Hotel Dieu, in Paris, the patient shall die of abscess of the lungs—though all the individuals subjected to these operations may resemble each other in apparent health, and be subjected to a plan of treatment alike in every instance. Nay, more,—in a succeeding year, the order of these results in the different institutions mentioned, may be entirely reversed.

So far we have been treating of fever in its simplest form, but it is now time to mention other results and trains of symptoms which may render the disease extremely complex and difficult to be understood. In explanation of our meaning, it is, perhaps, most proper to select an example from among those of the most involved character. We will select the case of an irritation in the intestines. A patient predisposed to abdominal disease, either in consequence of some personal peculiarity, or the epidemic tendency of the season, shall be guilty of an imprudent exposure, or an irregularity of diet. An irritation shall occur in consequence of this conduct in some part of the small intestines. These organs are supplied by the nerves of organic life, and consequently the brain takes no notice of what passes there until the mischief becomes severe. The part affected, perhaps previously weakened by the epidemic or other tendency, or by ill-regulated habits, is unable to resist the vigour of the general circulation, bearing with unusual energy upon this particular spot, in consequence of the urgent necessity of repairing, with the utmost speed, the injuries inflicted upon such important organs. The part inflames; the heart is called into undue action, and the functions of the intestines are embarrassed or overwhelmed. Still, the existing condition of things is not as plainly perceivable as it is when external parts are injured, for the general circulation is less obviously disturbed when the disease is confined to organs of which the vessels appertain to the portal system, (see page 89,) which is compared, in our earlier pages, to a para-

sitic plant, than when it affects, *directly*, the great arterial tree. The concentration of the vital powers upon the internal organs, resulting from their excessive irritation, render the external parts and other organs comparatively languid, and there is established a low, irregular fever, very different from that which characterizes external injuries. The countenance, and the skin in general, do not exhibit the strong marks of fulness that occur in ordinary fevers; for the blood is mainly directed to the viscera, and the natural impression that the disease results from general debility, is often impressed upon other minds than those of the uninitiated. The unresisted accumulation of blood in the bowels, soon produces an embarrassment of the circulation, and the vessels soon endeavour to relieve themselves by pouring out increased and vitiated secretions internally, even while the external surface is hot and dry, and the insensible perspiration is checked. The patient becomes affected with a dysenteric discharge.

The impression made upon the nerves of the part by this extreme and increasing irritation is conveyed to the great nervous centres of animal life, and all the most important functions are necessarily disturbed by this consecutive result. The several ganglions may be called on for a degree of exertion inconsistent with their healthful action, and each of these may become a new centre of irritation, calling for additional exertions on the part of the heart and great vessels, already debilitated by previous demands. If the disease advances, the irritation at length radiates from the ganglions to the spinal marrow, and the nerves of animal life become involved in the disease. Muscular power and the external senses are then embarrassed, and the general disturbance is at last continued to the brain itself,—low, muttering delirium comes on; the organs of respiration become affected; twitchings of the tendons, a ghastly countenance, spasms and insensibility make their appearance, and unless the superior powers of the constitution, with the aid of high professional skill and tact, enable the patient to conquer the disease, he dies! In the mean while, though every symptom seems to mark the presence of debility, the inflammation of the part of the small intestines which causes this long train of evils, goes on continually increasing, even to mortification, and the several centres toward which the irritation has been radiated—themselves, in turn, inflame; so that, instead of a single local injury, we have to contend with many, all of which are important and dangerous to life.

The professional reader would at once perceive, in the foregoing picture, the likeness of a disease formerly ranked among the most purely idiopathic fevers, but now well known to ori-

ginate in an inflammation of certain little glands upon the mucous membrane of the small intestines!

This disposition displayed by irritations, to radiate by means of the nervous connexions existing between different parts, explain a host of singular effects observed in the history of disease,—Such, for instance, as the following:—A blow on the head will sometimes occasion an abscess of the liver, and an inflammation of the liver will produce disease of the brain. A disturbance of the bowels will give rise to an eruptive disease of the skin, and an eruption on the skin will produce an injurious influence on digestion. Some irritations of the small intestines give rise to cramps of the extremities, and a broken limb is a very common cause of little scattered abscesses in the lungs. In the midst of all these endless complications, how absurd appear the pretences of those innocent empyrics who unhesitatingly attack diseases of which they cannot comprehend the seat, by means of remedies of which they neither know the nature or the action!

The general debility noticed in the more severe and complicated fevers, is not entirely the result of exhaustion of the system from over action: it frequently appears from the first moment of the attack, and is produced by the concentration of vital energy in the irritated parts, which does not leave enough for the proper supply of the other organs. But it is well known that the mere extent of surface affected by an irritation, has quite as much influence as its severity in determining its physiological effects; for a very slight scald over the whole surface of the skin will kill; while a hand or a foot may be burned to cinders in a furnace without endangering the life of the owner. The two facts just noticed enable us to employ, advantageously in medical practice, certain powerfully stimulating applications to healthy parts in order to lessen the intensity of violent morbid actions in other portions of the body. This is called *treatment by counter irritation*. Let us take an example:—A patient, with a strong determination of blood to the head, growing, perhaps, out of over application of the mind. He has a severe headach and confusion of ideas, with some disorder of the stomach produced consecutively, and complains of nausea, vertigo, noises in the head, and an extreme sensibility of the eye and ear. His physician orders him large mustard plasters to the wrists and ankles, and continues them until considerable irritation is produced. The head is relieved, and in the following manner:—The injury inflicted by the remedy is mild in grade, but covers a considerable surface. It does not endanger the integrity of the part, yet it calls off a great deal of vital energy from the sys-

tem in general, and the diseased organ, which in the case delineated, is the brain, shares in the diminution until, perhaps, its over excitement is reduced to the standard of health, and it is permitted to recover its energies and powers of resistance before nature has accomplished the cure of the inflammation caused by the mustard.

Drastic purgatives and other internal remedies of a highly stimulating character, are often employed in fevers and local inflammations, upon this principle of counter irritation; and there are cases in which the happiest results may follow such a course: but this mode of treatment has been carried much too far by the practitioners of the last age.

There are two important precautions which should always be observed in practising by counter-irritation. 1st. Strong stimulants should never be administered or applied during the height of reaction in fevers, because their direct effect in inflicting a new injury increases the violence of reaction, and must necessarily render the subsequent exhaustion more severe. If used at all in fevers, they should be employed during the remissions or intermissions. An exception to this rule exists in certain cases of low or typhoid fevers of long standing,—when dire necessity compels us unwillingly to support the sinking energies of nature at all hazards. But in these cases, the end in view is general stimulation, and not counter-irritation. 2d. Strong stimulants, applied externally, should never be carried to such an extent as to cause severe pain in cases of disease of the head, for the radiation of the irritation caused by the remedy to the other extremity of the nerves of the part may produce an inflammation, or an increase of the functional embarrassment in the brain!

The reader will now perceive that any local injury of considerable extent, and of sufficient intensity to produce a morbid change in the actions of the injured part, must generally produce a reaction of the circulation; or, in other words, a fever. On the other hand, every case of fever commences in some local irritation, which, in most instances, gives rise to other irritations in distant parts. The first of these affections, which has been already defined to be the *cause* or *proximate cause* of the attack, is called the primary irritation; the others are styled secondary or symptomatic. But it is a singular fact that the primary and secondary affections mutually act on each other in most cases, so that when either of them is exacerbated or relieved in any degree, the other shares in this change of intensity. Thus, if primary irritation of the stomach occasions the symptoms of mental excitement which was described on the last page, and the patient should venture to increase the disorder of the head, by applying his mind to serious thought,



his stomach would inevitably be rendered worse; and if a blow on the head should produce an inflammation of the liver, an active course of depletory treatment, addressed to the latter, would materially lessen the danger of the brain. This explains the reason why so much of our practice in medicine is directed to the mitigation of symptoms, instead of the destruction of the cause of the disease.

The removal of the proximate cause of a disease does not always produce a cure; for, on many occasions, the former is successfully combatted by the power of nature, while the secondary irritations perpetuate the disease. Thus, an irritation of the spine may produce disease of the heart, and the latter may destroy life long after the former has yielded to remedial measures.

When the symptomatic irritation is much more intense than the primary one, it sometimes acts as a natural counter-irritant, and the latter suddenly and entirely disappears, the former having called off all the surplus vital energy to itself. This is an instance of what is called, by physicians, *Metastasis*.

Metastasis generally takes place from parts of lesser to those of greater consequence in the economy; and as the affection is of much more pressing importance than its cause, it is often proper to endeavour to reproduce the original affection by means of appropriate remedies; and if we succeed, the secondary irritation commonly subsides as suddenly as it appeared! I remember the case of a lad who laboured under a disgusting disease of the scalp, which disappeared by metastasis, on five or six occasions, always producing furious insanity. The madness resisted every species of treatment until the eruption was reproduced, when he became rational immediately. Such accidents as this are common in most of the eruptive diseases, when they are arrested by improper exposures, or too energetic local treatment:—the eruption declines, and some vital organ becomes the seat of a dangerous and often fatal inflammation. To such cases of metastasis, produced by external causes, the term *revulsion* has been applied, though it is frequently employed in a more extended sense.

There is reason to believe that in most cases of revulsion, there exists a previous radiated irritation in the spot to which the disease is translated, but that this is mild, and masked, as it were, by the more obvious external affection. When the latter is suppressed too suddenly, it is easy to comprehend that the vital energy previously concentrated upon it, may not become regularly and safely diffused through the system; but may be suddenly directed upon the previously weakened internal organ, in such a manner as to produce the singular phenomena of metastasis.

The number of instances of serious disease, occasioned by the principle on which metastasis depends, is much greater than might be supposed at first sight; for it includes not only the revulsions of which we have been speaking, but all the evils following the sudden arrest of habitual discharges—such as apoplexy from the cure of piles, abscess of the lungs from the healing of fistula, convulsions and inflammation of the bowels from exposure in young females, &c.: in all which cases it is desirable, under ordinary circumstances, to renew the original affection, the suppression of which has caused the mischief; and where this cannot be done, it is often advisable to imitate nature, by establishing a similar local disease in some more convenient place, as is often done by means of issues, setons, moxa, and tartar emetic plasters.

#### OF IRRITATION AND HYPERNUTRITION.

I have now described, in a general way, both the primary and secondary effects of the function of nutrition, as displayed in the reproduction of parts, and have shown how disease inevitably follows the over-strained efforts of nature to produce a cure of injuries, whether the causes be internal or external. Let us now pass to the consideration of some of the consequences of increased vital activity in particular parts, when no apparent injury has been inflicted; consequences resulting from some inexplicable changes in the action of the tissues themselves, but probably produced by irregularities in the nervous influence, which, when properly balanced, preserves that mutual relation of parts so necessary to the proper support and sustenance of all the various organs of an animal so complex in structure as is man.

Under the operation of certain stimulants, and especially under the natural stimulus of exercise, any part or organ of the body may have its functions increased; and even its structural development is hastened by the continued action of such causes. The growth of muscles, under such circumstances, has been already mentioned, and this subject will claim additional attention in the chapter on Hygiene. To quote another and more curious example of the operation of this law, it may be mentioned that habits of thought and study not only strengthen the powers of the mind, but actually enlarge the brain. This state of things is perfectly consistent with health, though occasionally, when carried very far, it produces peculiarities verging on, and predisposing to, disease. Thus the constant employment of certain muscles produces those peculiarities of person, or slight deformities which characterize the

operatives in particular trades; and the habitual cultivation of certain instincts, moral feelings, or intellectual faculties, may occasion ungovernable passions, morbid feelings, or eccentricities of character.

It is still more curious that the same plan of counter irritation, which was spoken of in the last section, as a mode of treating fevers or inflammations, may be usefully employed in correcting the undue effects of the functional exercise of particular organs. Thus, the prescription of powerful and continued muscular exertion corrects the ill consequences of laborious study, and an application to the solution of mathematical study, has been known to cure muscular spasms!

But there are numerous changes of structure of a decidedly morbid character, yet somewhat of the same nature with those just pointed out. These are called instances of hypernutrition, and are marked by an undue growth of the part affected, of such extent as to embarrass some of its functions. This growth is the result of a chronic or habitual increase of the vital energy of the part, to a degree inconsistent with health; but not distinctly marked by those changes in colour, temperature, and sensibility, which distinguish the process by which injuries are repaired, nor by those symptoms of fever that present themselves during the reaction consequent upon such injuries.

Hypernutrition almost invariably consists in an increase of the interstitial depositories of the tissue interested, and rarely leads to any great addition to the cellular or primitive tissue. It is considered as a result of one of the lightest shades of organic *irritation*, which latter term we shall not attempt to explain at full length; for it is extremely difficult to say in what acceptation it is received by the profession at large: so various and, apparently, inconsistent are the phenomena attributed by different theorists, to this very general term. In few words, it may be defined to be a morbid increase of vitality in some particular organ, tissue, or system, not sufficient in degree or extent to constitute an inflammation.

As the principal effect of hypernutrition is the unnatural increase of the interstitial matter distending the cells of the cellular membrane in the different compound tissues, it may be fairly said to include the unnatural increase of the serum which lubricates the cells of the free or general cellular tissue itself, and also the serous cavities, whenever this accumulation is the result of increased vitality in the part.

Dropsy, whether general or local, is commonly a consequence either of a merely mechanical obstacle to the free circulation of the blood, or of a similar difficulty caused by a change in structure in some highly important organ,—the

dropsy being, in fact, a symptom of some other much more serious accident, or disease; and until the latter is removed it is in vain to attempt the cure of the former.

It may seem strange that we should rank dropsy among the diseases of increased action, when it is so universally considered as a mark of debility; but it does not follow by any means, because a particular portion of the body is acting with undue force, that the system in general should be found in a similar condition. The reverse of this is more frequently the case, and general debility often acts as an exciting cause of local activity. The functions of the free cellular tissue, and of those parts which are most liberally supplied with this tissue, appear to increase as the powers of animal life decline, and they continue in certain instances even after the death of the individual! As persons decline in life, or become weakened by disease, the more dependent portions of the body begin to display a tendency to dropsical effusion, and the extent of this disposition increases as the powers of the system diminish. Perspiration is one of the last lingering operations of life, and even after the body has been laid in its final receptacle, the hair and the nails may continue to grow! It would seem that those portions of the most complex animals which resemble in structure the bodies of the simplest animalcules possess some power analogous to that by which the latter preserve their vitality when dried and laid aside for years!

But the cellular tissue is the seat of numerous other changes of structure more obviously the result of hypernutrition, complicated, perhaps, with some change in the nervous balance of the part, by which the operations of the tissue are modified, and the deposits altered in character from that of serous effusion. One of the most usual examples of this is found in the formation of cavities or sacks distended with fatty, gaseous, or gelatinous matter, and constituting tumours which go on increasing until removed by the knife or remedied by other measures. The changes appear to be effected without calling the capillary blood vessels into any undue action; and may even be arrested and removed by measures which increase the degree of irritation in the part, and promote the rapidity of capillary circulation. Thus, if the cavity of a gelatinous cellular tumour be laid open with a knife, and its contents be evacuated, it becomes so much excited by the injury, that its cavity is often obliterated by adhesion, and its peculiar secretion disappears. Again, if a wen be repeatedly rubbed every day with a saturated solution of common salt, it will frequently inflame, become gangrenous and slough away, through numerous little holes in the skin; and the disease will be found perfectly cured.



Among the parts of the body which are more purely cellular in their structure—the skin, is peculiarly liable to hyper-nutrition. It is seen, generally, in elephantiasis, and locally, in corns and various excrescences. The causes of the latter tumours are often purely mechanical.

In the locomotive apparatus, such consequences of irritation are less frequent, but they are seen occasionally in the knotty enlargements of tendons produced by local pressure, and in the nodes and other swellings of the bones.

Hypernutrition of the hollow viscera, is not at all uncommon. It is seen in the heart, from spinal irritation; in the stomach, from over-eating; and still more commonly from the habit of taking inordinate quantities of fluid; and in the bladder, from obstructions to the discharge of urine in stricture, gravel, &c.

In compound organs, such as the bones, for instance, the excess of nutrition may be confined to any one of the several ingredients of which those organs are composed. Thus, in some cases the quantity of animal matter is increased, and the bones become so soft as to bend under the action of the superincumbent weight of the body, constituting what is called *mollities ossium*, and giving rise, in childhood, to bandy-legs, and even club-feet. In other cases, the quantity of earthy matter is thrown down in undue amount, and the bones are rendered so brittle as to break under slight muscular exertions, constituting the disease termed *fragilitas ossium*. It is often difficult to determine whether these changes result from an increased supply of one ingredient, or a diminished secretion of the others; and it is sometimes of great importance to distinguish between these two conditions, for, in the former, there is always an undue degree of vital activity in the part affected, while, in the latter, the cause of the change of structure is more frequently an irritation in some distant organ or system which calls off the vital power in another direction, and thus induces a symptomatic and secondary debility of that part. Under circumstances so opposite in character, it is obvious that very different courses of treatment may be required.

In the foregoing remarks, we have considered hypernutrition as the result of modifications in the transmitting power of the tissues, to which, in a previous section, the function of nutrition has been attributed. But it is obvious that the condition of the vessels, and the circulating fluids, must exert an important influence upon the effects of irritation in producing these alterations of structure, as upon them depends the quantity and quality of the material furnished to the parts interested.

It is also obvious that the action of the nerves is equally

engaged in the process; for, independently of the control over the operations of the tissues, exercised *directly* by these connecting wires of the animal machine, (see page 130,) the mutual association between the nervous energy and vascular activity is so intimate and constant, that it is impossible for either to be increased or diminished without a corresponding alteration in the other. It is impossible, however, to prosecute this subject farther on the present occasion.

The application of general principles to the treatment of diseases resulting from hypernutrition, is by no means difficult. The remedies are of two classes. 1st. Those addressed to the part affected; and 2d. Those intended to act on distant parts, or upon the system generally. Among the former class we may place *mechanical pressure* at the head of the list, whenever it is applicable. This remedy acts by diminishing the quantity of the circulating fluid supplied to the part; it resists the deposition of new matter, and it encourages the absorption of the surplus particles which have resulted from the disease. In all these ways it tends directly to remove the evil. Pressure also benumbs the sensibility of the nerves, and thus lessens the vital activity. Unfortunately, this remedy is applicable only in cases of external disease; and when these are characterized by a high state of nervous excitement, the pressure cannot be tolerated.

Next in order, we may rank *absolute rest of the part*, by which we mean not only mechanical rest, but also, *rest of the functions of the part*. Suppose the eye or ear, for instance, to be the seat of an organic irritation, tending to produce a hypernutrition of any portion of the organ, it is just as necessary to prevent the patient from exposure to light or sound, and to cause him to avoid the exercises of leaping or running, so as to agitate the fluids and quicken the circulation; for, whatever induces the exercise of an organ has a tendency to increase its vital activity, and especially its nutrition.

*Cold applications*, and other sedatives, are also among the very important remedies; but, as these always induce a reaction, unless their application is continued for a considerable time, it is productive of more injury than benefit to use them partially or timidly. Their action is very similar to that of pressure, and their applicability is even more extensive.

*Local depletion* follows next. The action of cups and leeches is this. They remove from the blood vessels in the neighbourhood of the part, a portion of their surplus supply of blood, and, at the same time, they diminish the whole amount of the circulating fluid,—but the wounds and the irritation directly resulting from the bites of the leeches, or the blades of the scarificator, determine an additional flow of blood toward

the part. If the quantity abstracted be large, the local nervous excitement is lessened, the morbid sensibility of the nerves is relieved, and the capillaries are allowed time to retract and recover their energies; but, if it be small, the effects of the additional irritation, produced by the remedy, may more than counterbalance the benefit derived from it, and the disease may be rendered worse, instead of better. As hypernutrition is commonly the result of chronic and tedious affections, local depletion cannot be carried so far in complaints of this nature as it can in cases of decided and severe inflammation, and it is therefore less frequently applicable in the former than in the latter class of morbid actions. Yet it is frequently employed with a happy effect.

*Stimulating applications* are rarely proper, because their immediate effect is to concentrate additional vital force in the parts to which they are applied. But it is found that the results of irregular hypernutrition possess a less perfect organization, and are less capable of resisting destructive agents than the healthy portions of the body. Stimulating applications are, therefore, occasionally useful in producing inflammation in the newly formed parts; by which means they are actually destroyed and caused to slough away, as is frequently the case with superficial wens and fatty tumours, particularly such as are so frequently observed upon the head, in persons who have passed middle life. This is a mode of treatment employed more in condescension to the fears of the patient, than to the proper laws of the science, for the remedy is quite as painful, and certainly more dangerous than the knife, when the latter is properly employed.

The action of the two last mentioned remedies will explain to the popular reader a fact which puzzles many; namely, that two different plans of treatment, diametrically opposed to each other, may sometimes prove equally successful in the cure of the same disease!

The general remedies which are applicable in cases of hypernutrition, may be again subdivided into *evacuants*, *counter-irritants*, and *tonics*. The former are employed when the patient is in high health or plethoric. They act on the disease by diminishing the force and quantity of the circulation; and some of them, like the drastic purgatives, may also prove advantageous by counter-irritation.

The regular counter-irritants, such as issues, setons, moxa, blisters, &c., are frequently serviceable in the manner already pointed out in the section on fever. They must be employed mildly and for a long period of time, to produce much advantage in cases of hypernutrition.

Tonics are used in many cases where the disease occurs in

persons of weakly or exhausted constitutions, and it is quite possible for this condition to be produced by the disease itself, notwithstanding the slight degree of irritation commonly observed in such cases; for, when the organ affected is a vital one, the embarrassment of its functions alone, may cause a general disturbance sufficient to sap the energies of the whole system. This is proved by the history of many instances of hypertrophy of the heart and liver. The mode in which tonics act beneficially is this: they strengthen and elevate the tone of all parts of the body so as to restore them to their natural energy. In accomplishing this purpose, they undoubtedly tend to stimulate the seat of the morbid irritation, in common with all other parts; but the increase of vital action, and the regulation of the balance of excitement in the organs, generally, tends still more powerfully to depress that morbid irritation by calling the vital powers into play in other quarters.

Besides the classes of medicines already noticed, there are several other agents employed in practice with very great effect, but of which the mode of action does not admit an easy explanation. They are principally prescribed in those forms of hypernutrition which appear in the bones, glands, and other complex organs, and in those which are the result of what are ordinarily called *specific diseases*. These remedies have a most powerful action in promoting absorption, but how, we know not. Among them we may notice calomel, and arsenic, in glandular swellings and the nodes of bones and periosteum; colchicum in gout, and iodine in tumours, of almost every description.

#### OF CAPILLARY IRRITATION—INFLAMMATION.

Having dismissed the subject of irritation, as displayed in modifications of the transmitting power of the tissues, it is proper to follow up the inquiry by speaking of the effects of irritation on the capillary circulation; but so much has been already advanced on the subject, in the section on mechanical injuries, that our task will be a light one.

It has been seen that the first object of nature, on the occurrence of an injury, or an undue excitement of a part, is the repair of the part. To accomplish this end, she directs toward the part an increased amount of nervous energy, and enlarges the capillaries to facilitate the freedom of circulation in the injured spot. She goes still farther when the case is a grave one, for she enlarges all the principal arteries going toward the injury, contracts all those leading to a distance from it,



and then calls the heart into violent action to increase the rapidity of the flow of blood.

The term irritation has been so constantly applied in very recent times, to this peculiar condition of an injured part, that the idea of irritation is inseparably, though unfortunately, associated with the idea of an increased capillary circulation;—one of many effects being thus substituted for a cause;—and the whole group of associated phenomena involved in the healthful operation of repairing injuries has been set down as a disease! Hence all the interminable attempts to define the words *irritation* and *inflammation*, and the long shelf-loads of volumes written on the vexed question, whether the latter is a disease of excitement or debility!

The term capillary irritation, simply considered, ought to be confined to the designation of that condition of the capillaries which attends upon the sanative operations of nature in removing injured, and in restoring lost parts.\* When the parts become exhausted by such efforts, and no longer capable of resisting properly the impulse of the blood, so that the very attempts at cure become a source of disease, the condition of things is changed, and the terms should be changed also.

The reader will now be able to comprehend the motive which induces us to discard the word irritation in the sense in which it is employed by the founder of the popular medical doctrine of the day, and to employ, instead thereof, the word *inflammation*, confining the meaning of the latter to conditions which are decidedly morbid.

Much of what we have to remark upon the subject of inflammation has been given to the reader in the section on the reproduction of parts, and in that upon reaction. All that we propose at present, is to recall to mind the fact that the different parts concerned in an inflammatory action may be in very

\* Much has been written, and some ill feeling has been displayed by physiologists, on the question of the primary effects of irritants on the capillaries; some asserting that they contract, others, that they dilate them. And the contending parties regulate their ideas of the active or the passive nature of inflammation accordingly. Now this is really illogical. Inflammation is not a direct, but a consecutive effect of the application of irritants. Some irritants do certainly contract parts—as the *astringents*; others as certainly expand them—as *heat*; and both, alike, *occasion* inflammation, though neither of these changes just noticed *constitute* the disease. Two things are certain—inflammation is always attended with enlargement of the capillaries, and enlargement of the capillaries is always attended with relaxation of the arched fibres of the middle coat. This is no proof that inflammation is a state of increased, or that it is a result of diminished action. The relaxation may be, like many other similar phenomena, a mere result of a natural consent of parts consistent with either theory. If these facts had been duly considered by physiologists, a deal of ink and paper would have been saved.

different conditions, requiring the application of various and opposite remedies. This is done in order to show the fallacy of the idea entertained by many followers of Broussais, that the local application of stimulants to internal parts in a state of inflammation, or as they term it, irritation, is always improper. This conclusion they would hardly attempt to defend to the fullest extent in theory, but it is obviously the principle on which they practise in fevers.

Let us take the case of a common bile, in a state approaching to maturity,—a case which has been described already in a previous section. The walls of the centre of the tumour are purple, engorged, and display marked feebleness of action. The circulation is here very inactive, or it is completely arrested; and the sensibility of the part is diminished. Apply stimulants to this part, and you will hasten the opening of the abscess; nor will even the use of powerful caustics occasion material pain, or heighten, in the slightest degree, the violence of the disease. The middle of the tumour is often in a state of high irritation, occasioning increased deposition, and hardening, analogous to a rapid hypernutrition. Stimulants would here be highly improper, and an active depletion may be, sometimes, very serviceable. Around the outside of the tumour the healthful process of adhesion, or the preliminary steps of the function of reproduction, are going on regularly, and should not be disturbed. Generally, reaction is aiding the proper progress of the case, or, from defects of constitution, the action of the heart may be too violent, or too feeble, for the purpose—and the general treatment must be varied according to these circumstances.

The mere extent of an inflammation may determine the propriety of using or avoiding stimulants in the treatment. Let us choose an example from the history of an accident familiar to all. A man shall burn his finger severely, and one of his elderly advisers who has heard that spirits of turpentine is “good for a burn,” shall apply this formidable article to the finger:—the patient will soon be convinced by bitter experience that the doctrine is incorrect! But hasty conclusions are seldom safe. Another patient shall fall into a hatter’s caldron, and the whole of his lower extremities shall be deeply and terribly scalded. Pale, and shivering in collapse, he is carried to an hospital, and the surgeon shall envelop his limbs in an ointment composed of lard and spirits of turpentine. After a tedious confinement, the patient may recover, telling me, “the sovereignest thing on earth, was turpentine” for an extensive burn!\*

\* I was once present when a little black boy was brought into the Pennsylvania Hospital in a violent frenzy. He had burned his eyes while playing with

If we apply the same reasonings to the treatment of internal injuries, which habitually govern us in the treatment of external complaints, (which is indeed the only philosophical plan of procedure,) we shall find the use of stimulants in fever, when properly applied, quite as reasonable as that of turpentine in burns.

Let us suppose a patient to be attacked with that species of inflammation in the intestinal glands which gives rise to typhus fever. If we give the patient wine in the early stages of this complaint, we do exceedingly wrong under all ordinary circumstances, for the inflammation is of small extent. True we do not give *pain to the patient*, for the nerves of the part affected are those of organic life. The old-fashioned plan of stimulating in typhus, has slain more men than Samson! Yet when, in the after progress of the disease, the radiating irritations have extended the inflammatory action to many other organs, and when the powers of the system sink beneath the unequal struggle, wine may prove not only useful but essential to the life of the patient!

But let us now choose a case of a different character. A patient appears in the first stage of malignant cholera. The whole surface of thirty-six feet of intestine are in a state of sudden and high irritation! He is in profound collapse, and the superficial circulation is totally arrested! The case resembles that of the extensive scald. Give him largely of brandy and opium, and he may recover. Treat him on an opposite system, and he dies!

How ridiculous, then, is that system which prescribes for *the name of a disease*, while it neglects *the state of that disease!* Even in cholera, of which we have just spoken, if stimulants were given in every case, the most serious evils would follow, particularly in temperate climates, where the sudden and profound collapse which marks its access in tropical countries is very rarely witnessed.

The treatment of inflammation should be governed by the same principles, and requires the use of the same classes of agents that have been recommended under the head of hyper-nutrition, except that pressure is more rarely applicable; but it is requisite to use the remedies with more energy and decision.

Before leaving the subject of inflammation, it is necessary to say a few words of *engorgement*;—an affection of the capillary

powder; and his mother, by the advice of a neighbour, had filled them with spirits of turpentine. “*The Doctor told her it was very good for a burn!*” By the aid of five stout men, the boy was held down on the counter until his eyes were well washed with a strong syringe and water! Strange to say—the organs were uninjured!

vessels often confounded with inflammation, and producing, in many instances, analogous results, though possessing a very opposite character.

The word engorgement has been employed quite as vaguely as the other terms which we have had occasion to define. By many, it is made to include a fulness of the vessels resulting from a determination of blood toward an inflamed or highly irritated point; while others have extended its signification to the distention observed in the vessels of a part previously weakened by inflammation; but these appearances are properly a portion of the train of consequences produced by capillary irritation.

The term engorgement should be restricted in its application to a condition often the very reverse of this, in which the distention results from causes resident, not in the part affected, but at a distance therefrom.

The causes of engorgement are purely mechanical; for instance, a tight garter is habitually worn above the knee, where there is but one bone in the limb, and where all the veins of the leg are compressed by the ligature. The circulation in the arteries is less embarrassed by slight forces, and the blood continues to flow through them into the parts beyond the garter, with much more facility than it can return by the veins. The latter vessels, and finally the capillary arteries also, are consequently distended, and a retarded circulation is established. The vessels being unable to discharge their burden, nature attempts their relief by calling into play the transmitting power of the tissues, and the more fluid parts of the blood are thrown out into the cells of the cellular tissue in the form of serum; the feet swell, and the patient labours under *œdema* or *local dropsy*. The distended vessels would be unable long to continue the circulation against such difficulties, unless their strength were increased, and nature soon endeavours to accomplish this purpose by causing a hypernutrition of the coats of the veins which become greatly thickened, while they are at the same time elongated and twisted; and the patients present the diseased appearance called *varicose veins*. But altered organs can never act with as much regularity and propriety as healthy ones, and, after some time, the thickening of the coats as well as the stagnation of the blood in the veins, interferes with the necessary nutrition of the surrounding parts, which soon become incapable of carrying on their vital functions for want of sustenance. The absorbents continue to take up the particles which are thus rendered useless, while few or none are deposited in their place, and the weakened parts disappear, leaving an irregular hole or sore. Nature still struggles to restore this loss; but the process of reproduction cannot be suc-



cessfully carried on with injured tools and an imperfect supply of bad materials, and the patient then labours under an ulcer of the leg, which it is often almost impossible to cure!

The same results very frequently follow the simple pressure of the column of blood, in persons of unusual height, who are obliged to be much upon their feet; and it is rare to see a man of fifty, measuring six feet or upwards, whose veins about the ankles are not in some degree varicose. The swelling of the feet so often observed in women during the latter months of pregnancy, is produced in the same way, by the pressure of the womb upon the veins of the pelvis; and many other singular affections in various parts of the body result from similar causes. If the mechanical obstruction take place in the heart, the patient will often suffer from general dropsy, for, in that case the engorgement is general.

There is another set of engorgements of a much more severe, but often transient character. The application of cold, or any other *direct sedative*,\* to the whole surface of the body, occasioning a contraction of its capillaries, drives inward a large portion of the circulating mass; and if the veins of any internal organ are previously weakened, that organ becomes engorged. Certain vital obstructions in the capillaries of the liver, are very common causes of engorgement of the portal circle; and if these obstructions are frequently renewed for a long time, all the consequences of varicosity, such as dropsy, thickening of vascular parts and ulceration may occur within the abdomen. This is witnessed in the liver and spleen in old cases of neglected intermittent fever.

The proper treatment of engorgement is very obvious. 1st. When the disease affects external parts, mechanical contrivances must be made to support the veins, and all mechanical obstructions to a free circulation must be carefully removed. 2d. The distention of the vessels may sometimes be relieved by local blood-letting frequently repeated, and by promoting the natural secretions of the part. If the portal circle be the seat of the disease, leeching the verge of the anus may be made to act directly in relieving the vessels of the abdomen, which are not provided with valves,—a course of treatment plainly pointed out by nature, which often effects a cure by repeated attacks of piles. This remedy may be aided by saline purgatives, upon an obvious principle. 3d. Counter-irritants, of the milder and more durable cast, are often useful in divert-

\* With all due deference to the opinions of certain physiologists, we hold few positions to be more absurd than that which attributes the contraction of the circular capillary fibres to an increase of action in the part. The whole history of disease most plainly proves that precisely as the nervous energy declines, the capillaries contract.

ing the force of the general circulation from the diseased part.

### OF NERVOUS IRRITATION.

The nature of the nervous influence is so little understood that it will not be surprising to the reader to hear that the characters of nervous diseases are among the most difficult of medical studies. Indeed but little is yet known of them.

In the few remarks that will be made on this subject, the term nervous fluid will be freely employed, not because the nerves are vessels containing any liquid in their cavities, for they are solid, and have no cavities; nor because they convey from place to place any occult, imponderable fluid like heat, light, or electricity; for, though such a fluid is very probably secreted and conducted by the nerves, the fact remains to be proved. We employ the term, therefore, merely because the phenomena of nervous action can be more intelligibly explained upon the hypothesis that it is dependent upon the motions of a fluid than upon any other supposition.

It has been stated that the power of the nerves and the fulness of the capillaries were mutually dependent on each other; but it must not be supposed that the influence of the nervous system is always lessened by the abstraction of blood, or increased by the habit of over-eating and plethora. The very reverse of this is often the case. As the more important vascular organs become the seat of undue determinations of blood, simply by over-bleeding or starvation, so the nervous centres become the seat of increased excitement from the general debility of the system; for it is rather the relative than the actual strength of any part that determines its influence on the vital operations of the animal.

It seems to be a law of the animal economy that there should be a perfect balance of power throughout the nervous system when in health and at rest; but that the moment we commence to move, or are subjected to any local excitement of the nerves, the nervous fluid is directed more especially to the organ used or irritated, leaving the remainder of the body relatively deficient in nervous energy.

When it is recollected, in addition to the facts just noticed, that any cause which throws an unusual amount of blood into the capillaries about any particular portion of the body, has a tendency in the first instance to heighten the nervous power, it will be at once perceived that all the several classes of remedies which are recommended in capillary irritation are equally applicable in nervous irritation; and that the method

of treatment, by counter-irritation, is peculiarly adapted to the management of the latter class of diseases.

But, besides these various agents, there are others which appear to possess peculiar powers in increasing or allaying nervous excitability. Among the most important of which are the stimulating *antispasmodics*, which act as counter-irritants, and the *narcotics*, or *opiates*, which act as direct sedatives on the nervous system after the excitement of the capillaries, which they generally produce in the first instance, has passed away. A few words added, on the order of phenomena produced by different degrees of nervous excitement, and we will pass to other subjects.

The immediate consequences of an impression made by a stimulant acting on a nerve, are an increased tendency of blood to the part, and the other preliminary steps which mark the commencement of an attempt at reproduction. There is also an acute and peculiar pain, if the nerve be a part of the system of sensation. The irritation commonly radiates without delay to both extremities of the nerve, that is, to the surface or organ in which it terminates, and to the nearest nervous centre with which it is connected. Hence arises a train of sympathetic affections, which have been sufficiently described already, and a series of functional disturbances in the organ or surface just mentioned, their character varying with the intensity of the irritation. It is to the last named symptoms that the attention of the reader is especially called at present.

In slight cases, the functional derangement consists in a simple increase of activity in the natural operations of the part. Thus, if the nerve be a cutaneous one, the skin of the part becomes redder and warmer than natural, and its sensibility is increased while the moisture of the part on which it terminates, instead of being checked, is rendered rather more remarkable. If it be an intestinal nerve, or one distributed to any part of the mucous membrane, an increased secretion of mucus takes place, or the patient is affected with symptoms simulating a catarrh; if it be a muscular branch, twitchings, or unusual motions are produced; if a nerve of the heart, palpitations ensue; if of the kidneys, the urine flows in greater quantity, &c. If the case be somewhat more severe, instead of a simple increase of the natural functions, we often observe those functions materially altered in character. For instance, in a mucous membrane the mucus is exchanged for pus; in a suppurating wound, the pus is replaced by a thin and highly irritating sanies; and in a muscle, the mere occasional twitching is converted into a strong spasm, placing the organ entirely beyond the control of the will. The frequent repetition or the long continuance of this grade of irritation, sooner or later

produces a change of structure in the part or organ supplied by the nerve.

If the grade of the affection be *very intense*, the effect is reversed, and the part is completely paralyzed. According to the organ subjected to the change, the urine ceases to flow, or the bladder to contract, the muscles become palsied, or the bowels remain obstinately bound, refusing to answer to the action of any purgative. And if this state continue for any great length of time, the patient must die, or the part will dwindle away for the want of use, leaving little but the cellular tissue which originally formed it, to mark the spot which it previously occupied.

Irritations of the nervous centres are the more important, the greater is the extent of the vital operations over which they preside; and when they are grave in character, the issue is generally mortal.

The brain, that proud distinction of the more complex animals which raises them so infinitely above the semi-vegetable existence of the simpler tribes forming the lower links of the animal scale, is rather a combination of centres, than a single centre of nervous energy; and some very curious proofs of this fact are presented in the history of its diseased actions.

Portions of the brain have been lost by fractures of the skull in falls, and by sabre-cuts in battle—and even musket bullets have penetrated it without destroying life! yet, as a general rule, all very serious injuries of this mass of nervous matter are considered fatal. The danger is greater the nearer it approaches to the junction of the spinal marrow at the base of the brain, for that is the spot toward which all the nerves of animal life, whether internal or external to the brain, appear to tend.

Injuries of the upper and anterior portions of the brain appear to be much less serious in their immediate consequences, than those of the posterior and lower portions, provided the nature of the mischief is not such as to occasion extensive irritation, or general pressure on the brain; and this fact is beautifully consistent with the theoretical views of the phrenologists. For the upper and anterior parts of the organ are the supposed seats of the moral and intellectual faculties, while the lower and posterior portions are the known residence of many of the more important instincts, and also exerts a very direct influence over other vital operations than those of the mind: and it is much easier for an animal to subsist without intelligence or sentiment, than he can without instinctuous desires! But all parts of the brain are too important to be long subjected to undue exercise, or irritation, without producing serious alterations in the balance of the system, and the vital



functions generally, and hence the reciprocity between the health of the body and the head has become proverbial.

By far the most curious circumstance in connexion with the history of the cerebral irritations, is the possibility of treating them by means of mental counter-irritation—a subject which deserves much more attention than it has yet received from the profession; and one which will form, before long, the philosophical basis of the moral treatment of insanity, as it has already shed new light on the theory of education! Much observation has convinced us that the best possible counter-check to the morbid excitement of the physical passions of man, is a close application to the study of mathematics or natural history! And, on the other hand, the over-strained powers of the reasoning faculties are best restored by those relaxations and amusements which actively employ the muscles, the senses, and the affections, thus exciting the nervous fibres of the posterior and lower portions of the brain.

#### ON THE BALANCE OF VITAL ACTION AND REACTION.

We have already spoken of the fact that an excitation of any one portion of the nervous system produces a diminution of the supply of nervous fluid in other parts; but there is one circumstance connected with this subject that requires some farther notice.

Whenever an irritation is produced in any given spot, its vital energies are, for a time, increased, while those of the rest of the system are relatively diminished; but, after a certain time the part becomes exhausted by its unwonted exertion, and the scales are turned. The system becomes relatively more vigorous than the part affected. The same causes being continued in action, the part soon resumes its powers and again takes the ascendant under the reaction of the general system. In this manner a continued vibration is kept up between the local affection and the rest of the body, becoming greater, or less violent, according to the comparative severity of the disturbing cause, and the resisting force of the constitution: This gives to the disease the appearance of periodicity, so generally observed, and goes far to explain the limited duration of fevers, their remissions and intermissions, critical days, types, &c.; matters far too abstruse to be considered in a popular work.

It follows, from the remarks contained in the last paragraph, that the treatment required at different periods in the progress of any attack of disease, may be very various, and that quite as much depends *on the proper time for the exhibition, as*

*upon the nature of the remedy.* A bleeding that may be very serviceable at three o'clock in the afternoon, may be very improper at ten in the morning, but may be absolutely demanded in the evening of the succeeding day! How injurious, then, is the custom of physicians in large capitals, who *always* send for a bleeder to open a vein! In the majority of cases this is well enough; but the physician should never be without his lancet, and should employ it personally on grave occasions, so as to retain, at least, the facility of habit, and a practical knowledge of the use of the instrument. It is a curious fact that some physicians, in extensive practice, who would set, or even amputate a limb, if suddenly called on duty, are yet afraid to open a vein! so complete is their habitual dependence on others!

#### OF VICARIOUS DISCHARGES AND TRANSFORMATION OF TISSUES.

There are some curious proofs of the influence of the nerves over the action of the tissues, and some that tend equally to establish the fundamental principle laid down in the first chapter of this work; namely, that the cellular tissue is the basis and original agent in the construction of all other tissues and organs. I allude to the cases of healthy or diseased action, in which one portion takes upon itself the duties and functions of another portion.

If, in females, the menstrual discharge be checked, it not unfrequently happens that the lungs supply the deficiency by throwing out blood, an accident which often excites extreme alarm when there is little danger. In like manner, the skin has been known to discharge urinous matter, when the secretions of the kidneys have been arrested by disease. In fractures and wounds of all the more solid organs, when there is any displacement of the injured surfaces, nature does not content herself with simply reuniting the dissevered parts, but hastens her operations, and renders assurance doubly sure, by calling on all the neighbouring tissues to supply a portion of the new matter, such as bone, ligament, &c., in order that the injury may be repaired as soon as possible.—As the object of these changes of function is evidently the promotion of health under circumstances in which it cannot be preserved by ordinary means, they are called *vicarious discharges*, or *vicarious actions*: but we see similar alteration of structure frequently occurring in situations where, instead of relieving or perfecting the system, they oppress or injure it. Thus, all parts of the body—not even excepting the brain itself—have been occa-

sionally seen converted into bone! and, under the influence of morbid causes, it seems as if the cellular tissue was furnished by the nervous influence, with power to create any compound tissue, or peculiar organic structure, *not only where it should be, but, also, where it should not be!*

When such transformation of tissue occurs, it is, in general, extremely difficult to discover either the cause of the change, or the remedy for its occurrence. When the misplaced product is soft, and capable of compression, pressure sometimes occasions its reabsorption; but when it is decidedly hard, as in ossifications, it is commonly impossible to effect a cure unless the part affected can be removed by the knife. Even this last resort must frequently fail; for, if the action of the free cellular tissue is so seriously altered in one particular spot, experience teaches us that the disease is extremely prone to reappear in other places, after the removal of the part at first affected.

It is unnecessary to bestow further attention upon those degenerations of tissue which result from the absorption of the interstitial deposits of compound tissues; for these have been sufficiently noticed in the earlier part of this work: but the morbid alterations observed in disease are not confined to the misplacement or destruction of the various organic products commonly observed in the body; other, and altogether different matters are occasionally deposited in the cells of the cellular tissue, having no affinity with any ordinary animal product. Of this nature are the tuberculous matter peculiar to scrofula and consumption, the constituents of cancerous and certain fungous tumours, &c. &c. Their extreme obstinacy, and, generally incurable character, are mainly attributable to our ignorance of the method in which they are produced.

In common with all newly formed or misplaced parts, these diseased deposits possess less power of vital resistance than the original structure; and, in many cases, their presence becomes a source of irritation to the surrounding parts, and ulceration of the most alarming and intractable character is a frequent consequence.

Our object, in the present and preceding chapters, has been to give the reader some idea of the mode in which reasoning and scientific observations may be employed in pursuing the study and practice of medicine. The very hasty glance which has been taken, is sufficient, it is hoped, to show the fallacy of the popular notion that almost any one, whatever be the nature of his education, is capable of becoming acquainted with this most occult branch of human learning; and the equally unfounded opinion that the patient "*surely knows his own constitution better than any body else!*" Let any candid man

examine the complex nature of many of the problems which have been rapidly stated in the preceding pages, and he will be able to judge of the justice of the boasted powers of empirical and ignorant pretenders to skill, and how far the venders of *universal medicines*, are entitled to the confidence of the public. It will be well, also, if he should modestly inquire of himself how far he may safely venture on applying the practical directions, which it is the chief object of this work to place at his command, at times, and in situations which admit of a reference to persons of superior information on medical topics.

What has been stated may enable him to comprehend the action and the propriety of many remedial measures hereafter advocated; but he will find very numerous prescriptions, the operation and philosophy of which, he will fail to comprehend, and which could not be explained to the uninitiated.



## CHAPTER IV.

## REMARKS ON HYGIENE.

HYGIENE, *or the art of preserving health*, as it is usually termed, is, in reality, an important and extensive science; but it would be inconsistent both with the limits and the objects of this work, to attempt any thing more than a passing notice of the more valuable practical deductions drawn from its doctrines and established by experience. It forms no part of our design to appear *learned*; we are only anxious to be *useful*.

In fartherance of this view, the remarks contained in this section will be divided into five principal sections, on *food, raiment, air, exercise, and the management of the health of children*. Under each head will be given such practical directions as are most likely to be serviceable in the every day business of life.

## OF FOOD.

MAN, is evidently constructed with a view to the mastication both of animal and vegetable substances; and, accordingly, some of his teeth are constructed like the grinders of the graminivorous animals, while others resemble those of beasts of prey.

At various eras in the annals of history, certain nations and sectaries, influenced by false religion, or equally spurious benevolence, have contended against the propriety of subsisting upon animal food. In our own day, we observe the influence of this prejudice, *nationally*, in the worshippers of *Brahma*, and on a narrower scale, in the monomaniacal conduct of certain advocates of a most humane and reasonable doctrine—the *ultra-temperance reformers*!

It is not in the structure of the teeth alone that we perceive the truth of the position that Providence designed both the beast of the field, and the herb of the garden for the support

and sustenance of man! His internal organization is equally constructed with direct reference to this double purpose! His length of small intestine involved upon itself, and the several enlargements and tortuous course of his great intestine, are evidently contrived upon the model of the herbivorous tribes, while his single and simple stomach, so different from those of the ruminating animals, is clearly designed for the less laborious process of digesting meats.

Until, then, it can be proved to demonstration, that modern theorists are wiser in their knowledge of physiology, than He who gave laws to the science, and constructed the masterpiece of nature, it is ridiculous to argue upon the question which has been so much debated by a few enthusiasts!

Even those who act upon the doctrine that animal food is unnecessary to man, and therefore to be avoided on the principles of benevolence, would find but little encouragement from an actual comparison of the relative developments of those nations who abstain from it, and those who use it freely. The former are invariably weaker and less vigorous, and their longevity is less remarkable than the latter.

But it is much more difficult, perhaps impossible, to determine the relative proportion of animal and vegetable food which will be found most conducive to health. This proportion will be found to vary much with the climate and the temperature of the season. In tropical countries, the abundance of fruits and vegetables which burden the table throughout the year, points out, in the clearest manner, that nature designed the inhabitants of these regions to subsist chiefly upon plants; or, if we state the proposition in different terms, the constitution of man, in these situations, is habitually adapted to such food. In polar regions, on the contrary, scarce a trace of vegetable life remains, and the scattered population subsists almost exclusively upon animal food. Neither of these extremes is found consistent with the highest perfectibility; and it is probably owing, in a great degree, to the proper balance between the quantity of nutriment obtained from the two great kingdoms of organic life, that the people of temperate latitudes have ruled the world from time immemorial, and are likely to perpetuate their power to the end of time.

Next in importance to the nature of the food taken, is the mode in which it is prepared for reception into the stomach. Man has been called, emphatically, *a cooking animal*, but it may well be questioned, whether he has gained any great advantage by the cultivation of the culinary art. It is true that by the aid of fire, he appropriates to his use many substances which are either indigestible or poisonous in their natural

state; but his bill of fare would have been very considerable, even if all such articles had been excluded. Be this as it may, hereditary habit has not only rendered cooking necessary to health, but even the peculiar modes of dressing employed by different nations and tribes have become essential to their comfort; and many of the races may be distinguished by their food and tastes, almost as readily as by their physiognomy. To show how far the system adapts itself to peculiarities of habit in regard to food, it is sufficient to mention that a continental European soon becomes dyspeptic when he is boarding at the best of English tables; and the insular traveller is liable to the same evil on the Continent, until long familiar with the luxury of a Parisian kitchen. A curious example of the same nature, which comes home to the bosom of an American is this:—It is said that it is far more disgusting to a Parisian belle to sit at the same table with a dish of Indian corn, than for the unpractised school-boy of six years, to discuss a plate of olives!

If it is impossible to lay down strict rules of diet, which will be generally applicable to the residents of different countries and climates, it is equally so to establish such a code for persons of various ages, and diverse ranks and occupations. The sturdy labourer in the fresh air of the harvest field, would starve upon the rich viands of the citizen, while the latter would be altogether incapable of digesting the stubborn material in which the latter takes delight!

The student, whose muscular system is but slenderly exercised, and whose vital energies are chiefly concentrated in the brain, cannot tolerate the use of any considerable amount of animal food, without which, the operative would sink at his daily task. We have been absolutely shocked, on more than one occasion, when some delicate girl, whose fibres have been debilitated, and whose viscera have been enervated by the early mismanagement of nursing, and the neglect of physical education, has been rudely chidden in our presence, because she turned with loathing from the steaming of roast beef, or the doughy luxury of apple-dumplings! Her censor, perhaps, some florid, overgrown, though well-meaning tyrant of sixty, who has been permitted to resist the shocks of all manner of exposures, and, it may be, *dissipations*, to serve as a monument of the prodigious power of nature in the occasional construction of invulnerable constitutions! "Have done with these girlish whimsies! eat it at once! It never disagrees with me, and I have used it these forty years!" cries the incensed and *insensate* "head of the house," and the unfortunate victim of "good education" retires from the table in tears, with a stomach additionally irritated by the want of proper sustenance.

There will be ample occasion, in the after part of this chapter to enlarge upon this species of domestic oppression, particularly when speaking of boarding school mismanagement.

The quantity of food required by an individual in health varies with the amount of exercise taken, and the term *exercise* is here employed not only to express *muscular exertion*, but must be extended much more widely, so as to include the operations of all the organs, both of organic and animal life. Digestion is itself an exercise of the stomach; perspiration, an exercise of the skin; thought, of the brain, &c. Now the more an organ is employed, so long as it is not exhausted by over exertion, the more rapid and considerable are its internal changes; or, in other words, the more vigorous is the display of the function of nutrition in the part; and, hence, the more considerable is the amount of food required. In fact, the appetite may be regarded, in one point of view, as a kind of graduated measure by which we should always regulate the quantity and frequency of our meals: and it is often the only test by which we can ascertain when exercise is promoting the health, and when it is injuring the constitution. So long as the appetite improves under gymnastic training, the nutrition of the body goes on with increased vigour: but the moment that any important part begins to suffer from exhaustion, the appetite declines. This circumstance will be more fully noticed in a future section.

*Of Mastication.* The proper attention being given to the selection and preparation of food, the next thing that claims the attention of the student of Hygiene, is mastication. This process is absolutely necessary to reduce solid nutriment to a condition in which the stomach can act upon it with facility. Hence the infinite importance of the preservation of the teeth, the much neglected organs by means of which this reduction is accomplished. It is true that persons accustomed to laborious exertion, and especially those whose avocations, like those of the agriculturist, are pursued in the open air, may bolt their dinner in a few moments with comparative impunity; not so the delicate and sedentary! The national habit of rapid eating, which is so universally observed in our country, unless in the most refined circles of society, cannot be too severely censured. The ridicule cast upon us by foreigners on this account, though often intended to injure, has been of considerable advantage; and it may be confidently hoped that the day is not far distant when the mass of our fellow citizens will learn to enjoy their meals according to the custom of other civilized people. The inquiry is very frequently made, why has dyspepsia become so much more general of late years than it formerly was? There are probably many reasons, but of



these the strongest is unquestionably the habit of rapid eating. Perhaps it may be denied that our immediate ancestors were less addicted to this practice than ourselves, but supposing that facts may be adduced to establish this point, (which, however, we have not been led to believe by our researches,) the argument would still hold good; for the habits of the greater portion of the community have been totally changed since the days of our grandfathers. Then, the lad of eighteen was not considered a man, but might be seen on holy-day afternoons trundling his hoop, *flying* his kite, or playing at fives or wicket on the commons like a romping boy! His father was in the habit of taking daily exercise in the open air; for cities were small, the manufacturing population did not exist, and the merchant did not disdain to assist in packing his own goods; for the division of labour was not then carried, as now, to a high degree of perfection; time was not so valuable, nor were rail-roads ever at command to convey the traveller from place to place in luxurious idleness, unconscious of the motion. In those days, even the medical student commenced the study of his profession by pounding continually with the heavy pestle in the enormous iron mortar to advertise the passenger that there resided a disciple of Esculapius! Well might our grandfathers digest the half masticated dinner with less injury than we can! Even the habits of the weaker sex have undergone a similar revolution. Many a reader will remember the big spinning-wheel which hummed him to sleep in childhood, when one of the greatest recommendations to matrimony, even with the most fashionable of the sisterhood, was for the belle of the day to display on Sundays a gown of her own manufacture! Now, the progress of machinery has banished the wheel not only from the chamber of the metropolitan lady, but even from the garret of the farmer's wife! and we have been convinced by actual observation, that during this and other changes in domestic habits, dyspepsia has increased to an astonishing extent among the women of agricultural districts; and how could it prove otherwise when the cheese-press and the churn are exchanged for Scott and the piano; while apple-dumplings and tough pastry are demolished in double the weight and with thrice the velocity!

The injury resulting from rapid eating is not confined to the mere result of imperfect mastication; for it is well known that the cravings of hunger are satisfied by a much smaller quantity of food, when sufficient time is allowed to each meal, than when the business of the table is hurried through in a few minutes; and this fact, in connexion with the prevalence of the vulgar custom on which we have been animadverting, goes far to explain the frequency of plethora, headaches, habitual cos-

tiveness, and chronic hepatic disease in females and studious men. Some may be surprised to hear costiveness attributed to over eating; and indeed this affection, in the cases referred to, appears to depend quite as much on the want of exercise, as upon the errors of the table; for moderate agitation promotes the evacuations and the activity of all the actions of organic life, although severe jolting, such as we experience in a stage-coach on a rough road, diminishes their activity:—yet, excess in eating, by destroying the tone of the stomach, by calling upon it for unusual exertions, prolongs the stay of the food in that organ, and prevents it, at the same time, from undergoing the changes which fit it for passing through the alimentary canal with promptitude, and thus it becomes, not only an additional cause of costiveness, but a fertile source of intestinal and sympathetic irritations.

There is a mutual relationship between the condition of the stomach and the teeth, which is so intimate that if either be seriously affected the other is sure to suffer—and thus the habit of rapid eating has a tendency to destroy the teeth, and is one of the principal causes of the proverbial prevalence of decay in the teeth on this side of the Atlantic.

*Use of Saliva in Mastication.* It is not only by occasioning a mechanical division, and a crushing of solid aliments that mastication promotes the process of digestion; for it also secures the complete admixture of the food with the saliva,—a fluid which undoubtedly serves a double purpose in aiding nature in this most important operation. Though it is extremely probable that a peculiar liquid secreted by the stomach itself, is chiefly concerned in dissolving the food and converting it into chyme, yet there is every reason to believe that the saliva also contributes essentially to the solution. At all events, any disease which diminishes or vitiates the secretion of saliva, invariably produces a very serious disturbance of digestion, and every habit which occasions a useless expenditure of spittle gives rise to the same kind of mischief. Diseases of the pancreas, which organ, as has been already stated in the physiological chapter, is a kind of internal salivary gland, are frequently attended by results in many respects similar, but not perfectly identical. The reason of this is easily explained. The pancreas pours its secretion into the duodenum or commencement of the small intestine, and the food must pass from the stomach, which is the first and most important digestive organ, before it can be submitted to the action of the pancreatic liquor. This fluid, therefore, cannot properly supply the place of the saliva; for, in the absence of the latter, the mischief is done before the remedy is applied. Irritations of the pancreas react primarily on the small intes-

tines, while those of the salivary glands react upon the stomach.

Though the intestinal canal is lubricated plentifully by its own mucus, under all ordinary circumstances, it requires some assistance in giving a free passage to solid aliments, which would inevitably carry away the mucus, and come into contact with the delicate surface beneath, if these substances were not previously coated and intermingled with some other adhesive and diffusible fluid, calculated to prevent friction. This fluid is found in the saliva, which lubricates the whole surface of the passing mass, and prevents all irritations of the surfaces beneath. To the action of this fluid the reptiles owe the power which they possess, of swallowing with facility substances of greater diameter than that of their own body, as we frequently observe in the snakes.

The use of tobacco and its injurious effect on the constitution may be mainly explained upon the principles which have now been laid down. This drug is a native of our climate, and it is natural that it should be held in more general approbation amongst us than in most foreign countries; and hence it becomes the more important that we should point out the evils which follow its employment.

In all its various forms, tobacco acts as a narcotic, and lessens the nervous activity of the individual, especially in the parts to which it is directly applied; but, like all other articles of the same class, except, perhaps, prussic acid, and one or two others, it stimulates before it lulls. In the stimulating stage of its action, the sensations which are produced by it in persons who use it habitually, are highly pleasurable, and the secretions of the surface and surrounding glands are for a time increased. Even the exhaustion which succeeds this hyper-excitement is often agreeable, especially to persons of warm temper; but there is always an ulterior period of lassitude and depression, like that which follows the use of alcoholic stimuli, and requiring a repetition of the dose for its relief. Unfortunately, tobacco is a poison to which the human system adapts itself with astonishing facility—though so horrible in its effects when employed in any considerable quantity at first! But let none deceive himself into the belief that this adaptation is perfect, and that he can employ his favourite weed with impunity or benefit! The mischiefs resulting from indulgence, though latent, are not the less certain. The use of tobacco by snuffing is, perhaps, the most exhilarating and harmless mode of employing it; but even in that form it soon renders the mucous surfaces of the nose and throat dry and harsh, and places them in a condition which increases their liability to ulceration, while it destroys the delicacy of the

sense of smell, and changes the tone and quality of the voice in a manner destructive of all eloquence!

There are occasions on which snuff, by provoking spasmodic sneezing, may prove serviceable in disease: there are others in which there would be great danger of determining an apoplexy from the same cause. In persons who are unused to snuff, it may produce some benefit in chronic inflammation of the eye, and in temporary deafness from catarrh; for the effects of most substances applied to the mucous surface of the nose, are extended to the eye and ear,—the external membrane of the former, and the internal lining of the latter organ, being formed by extensions of the nasal mucous membrane. For the same reason, it is probable that the long-continued habit of snuffing, may occasion an imperfection of hearing, and an enlargement of the blood vessels of the eye; effects which we think we have frequently witnessed in snuff takers who have passed middle life.

The extent of mucous surface, impressed by the use of snuff, is less considerable than that which is acted on by smoking or chewing tobacco, and it is less closely associated by sympathy with the stomach, while it stands in even closer relation with the brain. Stimulating powders are therefore employed in many cases to relieve obstinate headaches, and although they can scarcely be classed among the very active remedies, their effects have sometimes proved advantageous. Snuff may be occasionally serviceable upon a like principle, but it acts most powerfully in a manner the reverse of the stimulating powders, though producing, in the end, the same result. The latter act as counter-irritants, calling off the nervous power from the brain to the olfactory nerves; the former diminishes the sensibility of the olfactories, and this sedative impression is extended to the brain. But it appears that most substances taken into the nose or mouth produce their characteristic effects most decidedly on the fifth pair of nerves, which are intimately connected with, and necessary to the perfection of all the senses alike; so that if any minute branch of these nerves be injured, it is quite possible for the taste, smell, hearing, or sight to be seriously affected by the accident. Disorders of this kind are occasionally witnessed after the extraction of teeth; and the dentist is sometimes censured harshly for an unavoidable result,—fortunately, the evil is almost never permanent. It is chiefly by virtue of this action on the fifth pair of nerves that tobacco sometimes proves serviceable in *tic douloureux*, neuralgia of the head, tooth, and earache, &c., when these complaints are chronic, or of long continuance; but it does not follow that the occasional success attending the use of this poison, will justify us in considering it the best article



in the treatment of such cases:—still less defensible is the position that the habit of using tobacco is proper with a view of preventing a tendency to such attacks—for it would be just as reasonable to advocate the chewing of opium, because that drug relieves pain in certain cases of local injury to which all men are liable! It is plain, then, that tobacco, like all other poisons, is occasionally valuable as a medicine, but that, by employing it habitually, except under very peculiar circumstances, we injure our constitutions and deprive ourselves of the advantage of the present effect of the remedy when it is imperiously demanded.

*Smoking and chewing* both act much more powerfully on the digestive functions, than taking snuff; but there are considerable differences in their mode of action. In smoking, tobacco acts upon a much wider surface, though in a milder manner. It is impossible to avoid the frequent inhalation of the fumes of the common cigar into the lungs; those of the pipe are still more liable to enter the air passages; and the hookah\* is expressly intended for inhalation. The latter instrument displays, in the strongest light, the extreme susceptibility of the lungs to the action of vapours thus introduced, and the rapidity with which the whole system may be acted on through this route. The Hindoos commingle spices with their tobacco, and dilute it with conserves, and then inhale until the lungs are completely filled with smoke. Novices in the use of the hookah are often intoxicated in a few minutes by the practice. From this it follows that the influence of smoking is diffused more generally over the whole system, and that the stomach suffers indirectly. Smoking, by its action on the lungs, occasions obstinate thirst, and general debility. The former result leads to the employment of immoderate draughts of fluid, and the latter incites us to the use of stimulating food and drink: thus, dyspepsia and intemperance are the ordinary consequences of habitual smoking. Chewing, on the contrary, produces a more intense effect upon a smaller surface. Its action on the kindred senses of taste and smell is very powerful, and the stomach immediately sympathizes with the mouth. The flow of saliva is also rendered unhealthy, and increased in quantity. If ejected from the mouth, the digestion suffers from the absence of the fluid in dissolving the food,—an evil which cannot be prevented by substituting water, or stimulating liquors: if it be swallowed, it enters the stomach combined with a virulent poison, which, however its effects may be diminished by habit, can never be rendered innoxious. To prove how terribly deleterious is this article so commonly

\* The East Indian pipe.

employed by our fellow-citizens, it is only necessary to mention the fact that death by vomiting has been known to follow the application of two leaves of moistened tobacco to the wrists of a delicate patient! We sometimes employ injections of tobacco to produce general relaxation in certain surgical accidents, but the remedy is so dangerous that it is recommended with extreme caution, and its prescription by any other than experienced men should be discountenanced by every one who has a proper respect for human life; yet it is not unusually administered by quacks and ignorant nurses, even in children!

*The quantity of food* taken into the stomach is a matter scarcely less important than its quality. When excess is carried to a very great extent, the mere mechanical effect of distention on the circulation is sufficient to produce serious effects in many cases. The abdomen being called upon to give entrance to a much larger amount of contents than it is in the habit of accommodating, the abdominal muscles cannot relax sufficiently to give it room, and the enlargement of the stomach on the one hand, with the resistance of the muscles on the other, press the blood mechanically out of the vessels of the intestines and the portal system. Consequently, the other blood vessels and the heart are oppressed and overloaded,—the skin becomes florid or purple,—the pulse laborious and slow,—the ideas confused, and the whole system is rendered uncomfortable and inactive, until the food has been in part digested and absorbed, and the muscles of the abdomen gradually dilated. This state of things is highly dangerous, and accounts for the frequent occurrence of apoplexy immediately after a hearty dinner or supper.

The continued habit of over-eating in this manner, produces a gradually increasing permanent distention of the stomach, and destroys the tone of its fibres, so that in time they cannot produce sufficient pressure upon the contents to promote digestion, and it is only when the stomach is well filled that this process can be carried on with activity—consequently, a portion of food remains too long in the cavity after every meal, and becomes a source of irritation and dyspeptic symptoms.

If the distention from over-eating is produced rapidly, it generally excites nausea, and the offending matter is often thrown up by vomiting, by the same process which we observe in the evacuation of all the other hollow organs.

The remarks just given explain the ill effects of the mechanical embarrassment of the stomach, but it is also liable to debility or disease from an undue exercise of its physiological functions. When highly spiced, or strongly stimulating articles are employed in considerable amount, the powers of the

organ are taxed to the uttermost, in order to effect the process of digestion with the greatest rapidity. This higher excitement is followed by an equivalent loss of energy which does not pass off until the stomach again requires the exercise of the digestive function, when it is called into unusual exertion with exhausted powers; and, consequently, it performs its office imperfectly, and soon becomes incapable of maintaining the proper equilibrium with other parts of the system, which is necessary to the preservation of health. Though the debility occasioned by the last mentioned cause does not affect the muscular coat of the stomach in the same manner with mechanical distending forces, it is nevertheless a most fruitful source of dyspepsia.

It is laid down as a law by many, that we should always leave the table with an appetite, if we desire to promote our health: but this is by no means necessary, for it is quite sufficient that we should avoid decided over-distention, and all undue stimulation of the stomach.

As a general rule, children require vastly more food in proportion to their size than adults, and the requisite quantity continues to decrease with advancing age, and for the best of reasons:—the vital operations, and the rapidity of the changes effected by nutrition, become much less marked as we grow older, and the waste of the system being thus rendered less considerable, a smaller quantity of food is required to resupply it.

The reverse of this appears to be the case with regard to the stimulating qualities of the food. The advance of age is attended by a loss of excitability in all the nerves chiefly from habitual excitement, and a consequent decline in the vigour of the organic functions. The vital powers are then frequently invigorated by the moderate use of diffusible stimuli, and highly seasoned food—so that some of the very causes of dyspepsia in early life may be classed among its preventives at a later period.

*Of drink,* little need be added after the remarks on solid food, which have been already offered. The same principles with regard to distention and stimulation, hold good in reference to fluids, but it may be well to impress upon the reader a fact which has received too little attention from medical men and teachers of Hygiene; namely, that the drinking of immoderate quantities, even of pure water, is among the frequent causes of debility of stomach and disturbed digestion, thus paving the way for ill health or serious disease. In a natural condition of the organ, all reasonable quantities of fluid are very speedily taken up by the absorbents, carried into the circulation, and, if not required, thrown out by the kidneys

and by perspiration: but when the quantity taken is sufficient to produce a full distention of the stomach, its fibres become habitually relaxed, and the fluid will then lay for hours in the cavity, and its presence there may be recognised by its regurgitation whenever the body is much agitated by running, leaping, riding, or any sudden motion. The way for the encroachment of disease in after life, is often laid in early childhood, by the habit of drinking too much water at a time, and it is well for all persons having the slightest tendency to dyspepsia to guard against this habit. When the weather, or any other cause provokes excessive perspiration, or when the quantity of urine discharged is very great, more water is required to supply the drain; but it should be taken, not in large draughts, but in small quantities, frequently repeated. It is, however, much better to employ such measures as are calculated to diminish the drain, rather than to increase the supply.

We shall enlarge upon this subject in speaking of the effects of stimulating drinks.

*The use of Stimulating Drinks* has given rise to so much discussion of late years, that it would be wrong to treat the subject with neglect in a work like the present. The incalculable evils following the abuse of such articles have produced a popular action and a state of public feeling on this subject, which, like most excitements, have outstripped the bounds of reason, and while effecting vast alleviation of the misery flowing from intemperance, have occasioned a reaction unfavourable to the calm discussion of the question. Not contented with the condemnation of the alcoholic liquors, the free blood of the generous vine, and the fermented juices of the fruits and grains, some advocates of temperance have carried the war much farther and reprobated the use of tea and coffee, mustard, pepper, and vinegar! These are all stimulants, they allege; and total abstinence from stimulants is the only protection against the insidious approach of habits of intemperance! We have here ample proof of the ridiculous extent to which theorists may be carried who neglect to define their terms, and also of the necessity for the diffusion of a little more physiological knowledge among the mass of the community! The student of the philosophy of life well knows that nearly all articles which sustain the human body and support animal life are stimulants, and those who have noticed what has been stated in the preceding chapter, under the head of counter-irritants, must have perceived that the application of a stimulant to one part of the body is often among the most certain means of diminishing the energy of some other part. A partial or one-sided view of these facts formed, indeed, the foundation of one of the most lauded medical theories of former times, which



taught that "life is a forced state," and that the action of stimulants not only *supported*, but actually *constituted* life! It is certain that without the use of stimulants life cannot be sustained, and the only remaining question is, what particular stimulants are healthful, and what are dangerous.

*Alcohol in its pure state* is a rapid poison, which acts powerfully on the tissues with which it comes in contact. Taken into the stomach, it probably alters the texture of the mucous coat, and whether it can then be absorbed into the circulation has not been ascertained. All that is known is that it will occasion death.

*Alcohol diluted* is a slow poison, and like most other articles of the same class, may occasionally prove useful in maintaining health or curing disease; but an habitual resort to any of the liquors containing this article, whether the quantity taken be large or small, invariably injures the health, though from the slowness of the approach of its ill consequences, they frequently escape notice, and when perceived, are often attributed to other causes. Diluted alcohol does not change the character of the surfaces on which it is applied, as the pure spirit does; and it is therefore freely absorbed, and enters the circulation, extending its influence to every blood vessel in the body. Of course, as this fluid contains no nourishment, and is altogether foreign to the blood, it is speedily thrown off from the system with some of the secretions; but it is a curious circumstance that very slight differences in the purity of alcoholic liquors occasion an unaccountable diversity in their effects. Thus, alcohol diluted with pure water, brandy, gin, whisky, &c., though alike in all respects except in the presence or absence of a little vegetable matter,—which is sometimes so small in amount as to be scarcely appreciable by weight,—produce impressions on the system of widely dissimilar character. For instance:—the alcohol, simply diluted, generally acts as a purgative, and is probably absorbed with difficulty, as its effects on the brain are confined pretty much to a pleasurable sensation, evidently resulting from a simply nervous or sympathetic impression, like the first enlivening effect of Champagne. This peculiarity has induced us to employ half an ounce of the pure alcohol diluted with a gill of water, as a mild laxative in certain cases of extreme debility, and although we would be far from warranting its use by persons not of the profession, yet it might be proper to call the attention of medical men to the subject, as the spirit in this simple state has never been employed in general practice. Gin, on the contrary, which can scarcely be distinguished from simple diluted alcohol, except by the presence of a mere trace of a volatile vegetable oil, is taken into the circulation with more rapidity than any other liquor, and is cast out with equal speed: but

it does not act as a purgative, except in a few rare instances, its chief operation being on the kidneys, which it stimulates to an increased flow of urine. The intoxication resulting from gin, is therefore prompt, but evanescent.

The diuretic properties of gin give this liquor a preference over all other spirituous liquors in certain cases of dropsical effusion.

Whisky, which can scarcely be distinguished from gin by its chemical properties, differs from it in producing a more permanent effect, and in provoking more free perspiration. It also acts strongly on the kidneys. When taken hot and mixed with molasses and some other articles, as is often done by direction of elderly ladies who are fond of domestic medical practice, its diaphoretic powers may sometimes prove highly serviceable at particular moments in the progress of catarrh, and even in some cases of intermittent fever, before the coming on of the chill; but it is a dangerous remedy, and under popular guidance, probably destroys more than it relieves!

Brandy, as it is commonly employed, is coloured with a considerable amount of vegetable matter, and it is probably owing to this circumstance that it acts so differently, in some respects, from the liquors already enumerated. It has a tendency in most persons, and under most circumstances, rather to check than to promote perspiration, and sometimes even restrains the secretion of urine! As it readily enters the circulation, and is thrown off from it with difficulty, its effects are much more permanent than those of other liquors, particularly on the nervous system; and for this reason it is one of the most unwholesome products of the still for the inhabitants of cold or temperate climates, and in dry situations: but, like most other noxious agents, it has its useful applications:—it is the best of the diffusible stimulants, where such stimulants are positively demanded among the old residents in swampy districts within the tropics. Fortunately, the regular alternation of the seasons in other regions prevents that constant exhaustion from perspiration and the undue rapidity of all the vital actions which characterize life in equatorial countries; and our remarks upon the use of brandy cannot, therefore, be quoted in defence of its abuse. If brandy, or any other alcoholic liquor be freely employed by the unacclimated in climates like that of Bengal, Batavia, &c., the danger of almost immediate death is rendered extremely great, so much so that it has been said that more than one half of all the foreigners settling in Calcutta and its vicinity die before the expiration of the first year, and chiefly in consequence of indiscretion in employing stimulant drinks which the custom of the country continually places before them! Yet how ridiculous is the attempt to

reason on this subject, like a quack upon his panacea, and to force all mankind to follow an *intemperately temperate* faith, until they become capable of living on bread and water! If the old residents in India were deprived of their brandy or other stimulus, the mortality among them would probably be raised to the same standard.

It will be questioned, very naturally, by the advocates of temperance, how the remarks just mentioned can be rendered consistent with the position previously taken, that the habitual use of such liquors proved invariably injurious? the answer is a simple, though a curious one. The climates in which alcohol becomes almost indispensable to life, are precisely those in which it is impossible to preserve the health for a long time by any measures. In Bengal, for instance, so universal is the prevalence of chronic liver complaint, that the lowest mercantile officer of the British East India Company is permitted to be absent from the country without the loss of salary, at least six months in every period of five years, in order to recover some little energy to resist the ceaseless sapping of the heat and miasmatic vapours of that interminable swamp! Yet even with every precaution, it is almost impossible to avoid hepatic disease for five years consecutively. The late celebrated missionary chief, the Rev. M. Carey, was said to be the only man of the pure European race who ever continued in good health for ten years in Bengal! The cause of this wide-spreading affliction is beautifully laid down by Johnson in his work on tropical climates. The long-continued heats, unrelieved by frost at any season of the year, produce a constant hyperaction on the skin. The perspiration is poured out almost unceasingly, and in immoderate quantities; the skin becomes debilitated, while it still continues under the action of powerful exciting causes, and the liver suffers sympathetically; for it is found that all general impressions upon the skin, have also a strong action on the liver. Extreme general exhaustion and debility are the natural consequences of the immoderate flow of perspiration; and the European residents of such countries as Bengal are thereby enervated to such a degree that they become incapable of sudden or powerful exertion:—their very voices are generally low and whispering, and their enunciation so slow that they are often understood with difficulty! Such debility is exceedingly dangerous, as it renders the system peculiarly liable to disease from trivial causes. Diffusible stimuli are so necessary to elevate the exhausted powers, that even the curries, and the hot spices which Providence has planted in those countries,—certainly not without design,—prove insufficient to arouse and support the vital energies without the aid of alcoholic liquors, and of these, the best is



brandy, because it acts more favourably on the skin, and rather tends to diminish than to increase the perspiration. Yet let it be remembered that the necessity for the employment of such a poison grows out of the previous habits and hereditary peculiarities of those who are foreign to the country:—the indigenous races of men require no such support, and are really the more healthy for that precept of their religion which prohibits the employment of strong drink!

The propriety of using stimulus after long residence in hot and damp countries, is proved by the fact that even ladies in India will often take a daily allowance of brandy and water sufficient to intoxicate a resident in temperate climates, yet so far is the custom from establishing a love of drink, that the moment a resident leaves the country and breathes the free, mild air of the ocean, he ceases to call for his brandy, often without being aware that he has changed his habits! The necessity exists no longer, and the desire ceases; so that if he become intemperate, it is only after another apprenticeship to the bowl!

It is easy, by a little reflection on the remarks just made, to trace the few cases in which the use of spirituous drinks may become proper in persons in health not resident in hot and damp situations.

When those who have passed middle life, find themselves extremely debilitated in consequence of the gradual decline of the vital powers so constantly observed as we advance in age, rendered more remarkable, perhaps, by previous habits of dissipation or precocious luxury, it may be advisable to resort occasionally to some diffusible stimulus calculated to give temporary energy to the functions of life, if an undue determination of excitement to any particular organ threatens the destruction of the balance of health. When great exposures to cold, or the depressing effects of miasmatic vapours, or impure air, have brought on extreme weakness or chilliness, a little gin or whisky may prove highly serviceable in hastening the reaction and increasing the excitement of the surface; but it must be remembered, that it is only *after the exposure that the rule applies*, for no point in Hygiene is better established than the fact that the use of stimulants before or during the exposure to cold, tends to lessen the power of vital resistance. Nor should it be forgotten that the remedy is here employed *medicinally*, and not as an article of diet.

In our own country, or rather in the northern part of it, the heats of summer are not continued for a sufficient length of time to induce the necessity of employing the same regimen which is required between the tropics, and it is found by constant and ample experience, that even the labourers in the har-



vest field accomplish a greater amount of labour, and endure with impunity much longer exposure to the intense heat of the sun when denied the use of alcoholic liquors, than when indulged in them; and the only occasion on which they are available in assisting labour, is when an individual is called upon by dire necessity to perform services for a short time only, but which exceed his natural ability. For such a purpose, when the task is to be accomplished in a very short time, the distilled liquors are perhaps the best stimuli; but when the exertion is to be continued for some hours, the malt liquors are decidedly preferable. Unfortunate necessity alone, can furnish an apology for such trials, and although by the aid of the stimulation, the work may be completed without any seeming difficulty, the individual invariably suffers, subsequently, all the evils of a state of exhaustion proportionate to the degree of over-exertion, and the effect of the beverage. Repeated attempts of this nature prove inevitably ruinous to the health.

We have now attempted to point out the few cases in which alcoholic liquors may be considered admissible as articles of regimen. It is unnecessary to dwell particularly on the manner in which they gradually undermine the health when habitually employed, that matter having been explained in our remarks on the action of highly seasoned solid food; but it may be well to mention that the liver is seriously affected in almost every case of even the moderate, but habitual use of spirits. It is also remarkable that the brain often becomes hardened in consistence, and performs its office much more sluggishly under the operation of the same causes. It is by no means necessary that the habit should be carried even to *occasional inebriation*, in order that these changes should take place; they are not uncommonly met with in persons who have always enjoyed the character of temperate men.

As it forms no part of our intention in the present essay to produce a connected treatise on Hygiene, we shall here close our remarks on drink, without taking especial notice of the various fermented liquors; for the knowledge of their various qualities, and the numerous poisonous substances and heterogeneous mixtures with which they are adulterated, or by which they are imitated, is now industriously circulated by those disciples of temperance whose peculiar notions on some subjects we have been compelled to combat, but whose labours have been of incalculable value to the public, as none are more happy to acknowledge than ourselves, for none have had more ample testimony of the fact. The subject of mineral waters is also avoided, because that portion of society who are able to resort to the springs, very readily and cheaply obtain in

other popular treatises, much fuller information as to their nature and uses than could possibly be compressed within the space allotted to the Hygienic portion of this work.

#### OF CLOTHING AND CLEANLINESS.

The subjects of clothing and cleanliness are so intimately connected in some respects in their relation to Hygiene, that it is deemed better to include them both in the same section, than to devote a distinct section to the remarks on baths, as is usually done in works of a similar character.

It is obvious that man requires, in most countries, the aid of artificial covering to protect him against the vicissitudes of the weather; and although, in some tropical districts, this protection is nearly or entirely neglected by the natives, yet the delicate skin of the white race requires to be secured from the scorching heat of the sun at the equator, no less than to be sheltered from the cold in other and more rigorous latitudes. Many generations would probably pass away, before the action of that wonderful law of the animal economy which adapts the constitution of man to almost all varieties of circumstances could bring about those changes which would permit the European to endure the exposures known to be harmless to the African. Many nations, it is true, expose particular portions of the person which others religiously cover, and hence arise a variety of opinions, both as to the propriety and expediency of particular costumes. "The more you expose a child to the air, and the lighter the dress he wears, the more vigorous and hardy you make him," says some theorist in education. "Let him run about without shoes or stockings, and dabble in the wet as much as he pleases—the dirtier the better! Children thrive in the dirt!" The rough sons of certain agricultural districts, where this advice is followed to the letter, even for a longer period than during the age of childhood, seems indeed to furnish abundant evidence in its favour; but if we inquire more particularly into the history of families in these sections of country, we shall be startled at the sacrifice of human life which has been incurred in effecting this physical induration. We shall find that nearly all the feeble and delicate are killed off by the experiment within the first two or three years; leaving none but those on whom nature has bestowed the hardiest constitutions to be subjected to the discipline above recommended! It is true, indeed, that a Scottish Highlander in his kilts, will undergo with impunity exposures which would probably prove fatal to almost any of his neighbours of the lowlands, but it must be recollected that hereditary habit re-

organizes human nature, and there has been little in the social position of the Highlander to do away with the physical peculiarities which he derives from his savage ancestors, among whom exposure continued a necessity until the laws of life rendered it innoxious.

Another sect would teach us that it is wisest to be armed at all points against the variations of the seasons; that every portion of the body which admits of it should be well and warmly clad, until we are compelled to live in an artificial hot climate of our own creation! but it would be well to remind these advocates of excessive caution, that the Romans constantly exposed the neck, and we are not informed that these hardy conquerors of the world were particularly subject to anginose affections. In our own day, the fashionable belle provides us with a far more important illustration. Her half clad feet and chest, her bare neck and shoulders, are alternately subjected to the heat of the ball-room, and the chill air of the theatre; and her dress—in its very structure illy-fitted to protect the person—is invariably composed of the thinnest materials which can be tolerated, in order that comfort, safety, and principle may be immolated on the altar of taste! It is true that these follies are not indulged with impunity, as the weekly bills of mortality amply testify, but that they are not universally fatal to the feeble frames and enervated constitutions of these hyper-refined creations of artificial society is quite sufficient to prove that the system of extreme caution in dress advocated and practised by many, is not by any means essential to health: nay, it is even injurious, for constant protection against vicissitudes of temperature, climate, and accidents is altogether impossible; and the fact that undue warmth strongly predisposes the individual to taking cold from trivial causes, is established beyond dispute by the observation of those who reside in tropical countries. In Bengal, during the month preceding the rainy season, when the thermometer ranges constantly and very gradually between 85 and 105 degrees of Fahrenheit, it is exceedingly common for severe catarrhs to result merely from the waving of the hot air by the punkah, or large fan, which forms part of the furniture of every saloon! If, then, we accustom any part of our persons to an undue degree of warmth or covering,\* we lay ourselves open to additional danger from trivial accidents.

\* It is a common error to suppose that the presence or absence of even the slightest tissues, is a matter of indifference in dress. Let a lady remove her gauze veil, or a gentleman shave his *favourites*, when about to face a keen north-wester, and the result will fully convince the party that neither gauze nor hair can be despised with impunity. Slight irregularities in the clothing of the feet are often the causes of much more serious disasters, than those of

In order to ascertain what medium in dress is just and proper in particular places and for particular persons, it is necessary to consider what parts of the body most require protection in all persons; and what peculiarities of the sexes require corresponding cautions with regard to other parts. The first of these questions alone requires attention here.

1st. *What parts of the body most require protection in all persons?* The same general laws which have been noticed in the preceding chapters are equally applicable in this department of Hygiene. As those organs of animals which appear first in ascending the animal scale are always the most important, because they are those most essential to the growth and existence of the animal, so they require the most perfect protection; for a disorder in their operations must necessarily disturb the whole system more certainly and seriously than a similar irregularity in any other parts. The abdomen is formed long before any other cavity, and within its walls is concentrated nearly all the apparatus of vegetative or organic life, (see p. 186.) Here, then, is the part which requires the most careful protection, for here is found the fundamental organization on which the building and repair of the whole body depend! But this protection is more necessary in early life and in advanced age, than during the intervening period, for the following reasons.

In early life, all the vegetative or merely organic operations of the animal are carried on with energy and rapidity, because the building is then *about being constructed*, while in middle life, the process of assimilation is only required for *repairs*. Those portions of the apparatus which are most constantly employed, are of course most liable to get out of order, and should therefore receive the most careful attention. On the contrary, in old age, the same parts become sluggish, and the demands made upon them are comparatively few; but at the same time, their internal organization is rendered imperfect by the deposition of an unusual number of particles within their substance, producing that species of induration of which we have spoken in a former chapter, as one of the characteristics of age in all parts of the body. It follows from these facts that, although the abdominal organs become less susceptible of impressions in advanced life, their powers of vital resistance are also diminished; and it is found by actual observation, that more is lost in point of safety, by the latter, than is gained by the former alteration.

more apparent consequence; for nature, like man, though prepared for great occasions, often seems negligent of trifles! and it is safer to run barefooted in the snow, than to change boots for shoes during cold or damp weather.



The reader will now comprehend our reasons for recommending that the abdomen should be better protected by clothing than the rest of the person, especially during the periods of childhood and old age.

There is one all-important law, which is not generally laid down by writers on Hygiene, and that it is desirable to impress as strongly as possible. *A partial covering of any cavity, is much more dangerous than an entire exposure.* Although it is highly proper that flannel should be worn next the skin in all cold countries and seasons, yet we well know that many individuals neglect the precaution with impunity. Now we venture the assertion, without the dread of contradiction, that no man can make use of a short flannel shirt that does not entirely enclose the lower part of the abdomen, or a shirt which occasionally rides up to the level of the top of the pelvis, without suffering severely, and often dangerously, from this partial covering. If young, he will be subject to attacks of inflammation of the bowels, diarrhœa, incontinence of urine, or strangury, for which he is totally unable to account;—and if old, he will be liable to similar paroxysms of rheumatism, inflammations of the kidney, or other evils equally inexplicable.

There can be no doubt that the employment of such garments as those just mentioned, and the neglect of the principle that partial exposures are dangerous, are frequent causes of the loss of human life! and it would be difficult to adduce a more beautiful proof of the vast importance of Hygienic details, apparently trivial, and scarce worthy of notice.

In order that the reader should be made fully acquainted with the principle on which clothing should be employed in protecting cavities from the effects of cold, it will be well to mention that the direct effect of cold on the contents of the cavities is rarely experienced in an alarming degree: it occurs only in cases of an approach to freezing; and is of course fatal, if long continued. The more important influence is an indirect one. The cold producing a contraction of the capillaries of the surface, and a corresponding diminution of nervous energy in the skin, it follows that the amount of circulation and nervous action in the internal parts must be proportionally increased. Hence, a greater liability to diseased action! The truth of this explanation is beautifully proved by reversing the proposition. Let the stomach be occupied by digestion, or let the lungs or intestines be irritated by any of the usual causes of disease, and immediately the surface becomes chilled, no matter what the temperature of the surrounding air may be. In the first mentioned instance, the blood was *driven* from the circumference to the centre, and is best recalled by

external applications; while in the last it is *enticed* from the surface, for the purpose of repairing internal injury, and is more readily replaced by remedies addressed to those parts which are irritated, than by any external treatment. When a man is chilled by exposure, the fire will warm him, but in the chill of an intermittent, a dose of forty drops of laudanum will often restore the heat of the surface in a few minutes, when all the blankets in the world would fail!

The chief object of clothing is to prevent this determination of blood to the internal parts during slight exposures: hence, the importance of protecting not only the abdomen, but the feet also, (distant as they are from the scene of action,) when we desire to shield the bowels against the effects of atmospheric changes; but on this point we shall speak hereafter.

As we ascend the scale of nature, after passing in review those animals which are provided with but one internal cavity, which generally contains alike the organs of digestion and respiration, we begin to observe a second cavity forming itself by the growth of a partition across the abdomen, converting it into two distinct chambers, of which the lower is the abdomen proper, and contains all the organs of digestion, and the upper is the thorax or chest, which, in man, contains the heart and lungs.

It is generally supposed that the lungs require more careful protection than even the abdominal viscera, but a moment's reflection will at once convince us to the contrary. Nature, whose laws are unerring, guides us on all questions of this kind. She has separated the abdomen more completely from all direct connexion with external things, and it is only at long intervals and for short periods, that any crude extraneous substance is permitted to act upon the *stomach*,—the other parts of the canal (in health,) being free from all contact with undigested matter. On the contrary, the lungs are at all times and unceasingly in contact with the atmospheric air and the thousand impurities which it contains: they are liable to great and sudden changes of temperature in the surrounding medium, acting upon them both internally and externally; for the walls of the chest are in many places thinner, and every where less loaded with subcutaneous fat than those of the abdomen. Moreover, though the assertion may prove startling to some, it is not the less true that morbid changes of structure in the alimentary organs are vastly more important and dangerous than those of the lungs! The latter, indeed, are often known to become impervious in more than half their extent, and yet life may be continued for years! Still stronger proofs of a similar character might be adduced; but enough has been said

to show that the protection of the chest by clothing, though of incalculable importance, is of somewhat less consequence than that of the abdomen. The latter should therefore be somewhat more warmly clad than the former, and in this respect the dress of females is somewhat more rational than the male attire.

Partial exposure of the chest is of course liable to the same objections which have been already urged against that of the abdomen; and it should be remembered that the lungs rise behind the clavicles, above what is commonly considered the cavity of the chest, and encroach a little on the base of the neck. The dress should always protect this part in cold weather, if we desire to regulate it on philosophical principles;—but the rigid laws of fashion interfere to prevent a proper system in both the sexes. The ridiculous cravat, invented to conceal a deformity! and the equally absurd padded stock are used to convert the neck and throat into a furnace, and the unreasonable temperature is adroitly made to cease at either end, precisely where it would be most excusable to employ it; namely, near the tonsils above, and about the collar bones below! In women, on the contrary, fashion not only exposes the base of the neck, but also the upper part of the chest. *Fortunately*, the natural tendency of such habits to run into extremes, *bids fair, ere long, to render this partial exposure a complete one!* It will then become comparatively innoxious!

The next great cavity of the body is that of the head, but this appears much later in ascending the scale of nature, than those previously mentioned. It also requires much less care, —for if we except the climates distinguished by the extremes of heat and cold, both of which render a head-dress absolutely necessary; the head adapts itself with great facility to any degree of exposure. It is only requisite to avoid rendering the head susceptible to slight impressions by too great warmth in the apparel, and to shun unusual currents of air, such as the waving of the punkah, which has been already mentioned as a cause of catarrh in tropical countries.

In proceeding to the consideration of the principles which should determine our mode of dressing the extremities, the first point of importance which strikes us is the feeble powers of the inferior, when compared with the superior extremities. The pressure of a long column of blood on the vessels of the legs, and the embarrassment of the circulation from that cause, together with the greater distance from the centre of circulation, render the vital operations in the feet peculiarly slow; while the sympathies awakened by impressions on the feet are even more extended and important than those which arise

from exposures of the superior extremities; consequently, it is necessary to clothe the feet more warmly than the arms, and a neglect of this law is often productive of great danger.

Having now dismissed the question of the parts of the body which most require protection from exposure, it is proper to consider the nature of the substances to be employed in clothing.

The properties requiring the greatest degree of attention in the selection of tissues or other materials for clothes are, 1st. The degree in which the material is capable of conducting heat. 2nd. The nature of its action on the skin. 3rd. Its porosity or power of imbibing or transmitting insensible perspiration; and 4th. Its colour and the character of its surface. The articles employed in dress are so various that it would be impossible for us to consider them in detail, and in the remarks which follow, we shall confine our attention chiefly to the qualities of dresses composed of linen, cotton, silk, wool, or leather, as this list includes most of the materials in common use.

1st. *On the conducting power of the materials.*—It is very easy to test the conducting power of any tissue or other article intended to be used as a garment, by the impression which it produces upon the sense of touch. Take a number of strips of different substances, and place them together in an apartment, until they all acquire the same temperature with the surrounding air. Then let each of these strips be applied, in succession, to the back of the hand, and it will be found that some of them will feel quite cold, others lukewarm, and others positively warm. Now these articles being all really of the same temperature, the apparent difference results entirely from the fact that some of them carry off the animal heat with more facility than the air, and therefore diminish the warmth of the surface, while others, on the contrary, have less conducting power than air, and thus confine the animal heat until it accumulates on the surface.

Linen is the coldest of all the articles commonly employed in clothing, and is infinitely more comfortable to the skin than any other tissue in warm weather, and in tropical climates; but this quality renders it highly dangerous when used without caution, and without sufficient clothing to envelop it. In situations, and at seasons when the temperature of the air is nearly uniform, or free from sudden changes, it is both safe and delightful for those who are not under the necessity of using severe exertion, and are therefore able to avoid being thrown into sudden perspiration. In the middle and southern parts of the United States it is a proper dress for sedentary and idle persons, during the months of June and July, and



during a part of August; but in the spring and fall, when the mornings and evenings are cool and the middle of the day intensely hot, it becomes improper; for the changes of the atmosphere produce their action on the constitution almost instantaneously when the body is clothed in linen; and though many persons in the vigour of life employ the linen shirt with impunity at all seasons, their experience furnishes no evidence of the propriety of such a habit, in delicate persons, or those susceptible of strong impressions from without. Even those who have been long accustomed to this mode of dressing generally find themselves compelled to employ flannel in winter, and cotton in the spring and fall, before they have passed the meridian of life; and the principle adopted by some parents and masters; namely; that thin garments and linen next the skin, in cool weather, are among the best means of "*hardening children*," deserves to be represented as a *murderous principle*!

On all tropical coasts, and in the neighbourhood of mountain ranges, where the sea-breeze or the cold air of the heights rushes in, after sunset, to constrict every fibre after the relaxation of the day, the use of linen next the skin should *always* be avoided; and the workman in the harvest-field who comes in from his labour, bathed in profuse perspiration, to set himself in the strong draught between the kitchen door and the great fire-place, while demolishing his cold collation of pie, milk, and cider,—might almost as reasonably circulate between an oven and an ice-house, as to encase his broad chest in linen while exposed to such sudden transitions of temperature!

In passing these strictures upon a favourite and truly delightful species of attire, we would not be understood to offer any objection against the luxury of linen sheets; articles without the aid of which hot weather is indeed a misery! Long ere we retire, the occupations of the day are over, and the heat of our bodies, as well as the activity of our minds, is tempered down gradually, so that in most situations there is no danger of any violent change of temperature for many hours; and if any thing of the kind is anticipated, it is easy to protect the person by other external covering much more completely than can be done during the day, when the European style of dress is employed. The momentary shock on leaping into bed, and the continued comfort attending the use of linen sheets, is indeed decidedly healthful; and the abdomen and thorax, which require the greatest degree of protection, are secured against the direct effects of this mimic cold bath, while the whole body is invigorated by the re-action it produces.

Next in order as an immediate application to the skin, we may rank the *cotton cloths*. Cotton is decidedly a bad con-

ductor of heat, although it is less remarkable in this respect than silk or woollen. Though more irritating to the skin than the former, it is bland when compared with the latter, and furnishes us with the best defence against the diurnal and other slight changes of temperature of hot seasons and climates. Not sufficiently warm for safety in winter, it is at all other times the best material for garments worn next the skin under circumstances which render the use of linen improper.

A peculiar property of cotton pointed out by Johnson in his work on tropical climates, is of so much practical importance, that it requires particular notice. A fresh cotton shirt excites perspiration in a remarkable degree, and becomes speedily wetted with the discharge. This does not render the wearer subject to a sudden chill on exposure, as is the case when linen is worn; but if the shirt be frequently changed, this constant drain from the skin soon reduces the strength, and increases the liability to disease. To avoid this inconvenience, which becomes serious in hot countries, it is best not to change the shirt daily, but to dry the garment during the night, and continue to wear it for two or three days before washing. When once saturated with perspiration it proves much less liable to the objection just stated, and we have often noticed, on long pedestrian excursions, that a march of forty miles in a day was performed with much less fatigue with a cotton shirt worn on the previous day, than with one fresh from the laundress.

Cotton hosiery is very commonly worn in this country during the summer, and by many females during the winter also. The latter practice is inexcusable, and is the source of incalculable mischief and destruction of life. If appearances must be consulted, in preference alike to comfort and safety, it is at least desirable that stockings of light woollen should be worn beneath the cotton.

Pedestrians, soldiers, and all persons accustomed to walking or standing during long periods should invariably employ woollen hose, even in the hottest weather; as a neglect of this precaution is very destructive to the feet.

*Silk* is at once a bad conductor of heat, and an exceedingly agreeable application to the skin. The perfect roundness and smoothness of the thread prevents it from creating the slightest irritation, but the same properties enable the air to circulate very freely through the pores of silken tissues, and in a strong breeze the wind meets with less resistance than it does from either linen, cotton, or woollen. The open fabrics of silk which are used for hosiery, shirting, &c., when used alone, furnish, therefore, but slender protection against exposures; but when covered by other garments which arrest the circulation of air between the threads, they become very warm

articles of attire. Silk, therefore, is among the best articles to place next the skin, as an under-dress, in moderately cold weather; but when worn loose, or as an outer covering, it is very cool, and fit only for the warm seasons and climates. It enjoys an advantage over all the other materials which have been enumerated, in the freedom with which it permits the exit of the insensible, and the evaporation of the sensible perspiration; and it is also remarkably exempt from that power of imbibing and retaining animal effluvia, which often renders clothing unhealthy, or make it a vehicle for the transmission of contagious diseases.

*Woollens*, and especially *flannel*, are invaluable as articles of dress, and the range of their usefulness is much more extensive than is generally supposed. When used next the skin, they combine a sufficient power of retaining the animal heat, with a freedom in transmitting the insensible perspiration, and a mechanical action on the skin which preserves just sufficient glow and excitement to heighten without exhausting the vital energy of the surface. These properties render them of infinite value in cold and damp countries, where the vital power of the skin is continually depressed by the atmospheric influence.

But the usefulness of flannels is by no means confined to the colder climates; it constitutes the best over-dress for protecting the person from the slight but dangerous vicissitudes of temperature in tropical countries. Being prepared of all degrees of fineness, it may be made into garments, loose, light, flowing, and airy—proving vastly more comfortable, even in the extreme of hot weather, than any other species of cloth, while at the same time it protects the wearer more perfectly against the ill effects of sudden draughts of air, the sea breeze, morning mists, &c., those fertile sources of disease between the tropics.

Of the skins of animals employed in dress, little need be said, for except as coverings for the hands and feet, articles of this character are now seldom used; still it is proper to notice the buck-skin shirt and drawers, and what are termed the *medicated hare-skins* for protecting the front of the chest.

Buck-skin is by far the warmest article which can be worn next the skin, and in the extremes of cold weather it is perfectly delightful to the wearer. With a shirt and drawers well made, and covering the person completely from the middle of the neck to the ankles, the wearer may fearlessly defy the most intense cold of our winters. It is customary to line garments of buck-skin with silk in order to prevent immediate contact between the skin and the garment; but this is altogether unnecessary, and by no means convenient,—for the

silk gives way very soon, while the buck-skin seems almost incapable of wear. The transmission of the insensible perspiration is also more easy when it has only to pass through one homogeneous layer, than when several thicknesses of different materials are applied. When buck-skin is worn for an inner garment, it should not be frequently changed, as it will not bear repeated washing without becoming altered in texture, and as it preserves the surface more free from all accidental impurities from without, it may be worn for an entire month without any breach of personal propriety. Almost any degree of exposure during the winters of the temperate zone, may be borne with impunity by those who are clad in buck-skin; but the utmost caution is necessary in relinquishing its use on the approach of warm weather, as the sudden change from such garments to any of those in more general use is extremely severe; and it is best to employ very stout flannel, or the thickest Canton flannel for an under dress during some weeks in the spring of the year, when buck-skin has been used through the cold season.

Under the name of *medicated hare-skin*, an article of dress of great value has been recently introduced. It is simply the skin of some species of the rabbit tribe, (the white varieties being commonly preferred,) tanned without removing the fur. The pretended medication is merely a trap to secure the popularity of the article by calling in the aid of a little mystery! It is worn on the breast, with the fur next the skin, and is an admirable protection to those who are in the habit of leaving the upper part of the chest ill-guarded. To women who cannot or will not employ buck-skin, it acts as a delightful and efficient preventive against catarrhs, and materially retards the advance of consumption. The wearer should be careful to select a skin large enough to cover the whole front of the chest, for if it be too narrow, it rather increases than diminishes the danger of exposure. The medicated hare-skin is usually sold by the druggists.

Within the last few years, the various tissues coated with the varnish of *India Rubber* which have been introduced into the system of the toilet, have attracted much attention, and it becomes requisite for us to notice the peculiarities of this species of dress.

The principal peculiarity of caouchoe is its total incapacity for transmitting the sensible or insensible perspiration, and the parallel power which it naturally possesses of cutting off entirely the access of moisture to the person from without. Prepared as this article was originally, when designed to be employed as an article of dress, the solvents of a spirituous or ethereal character employed in its application, rendered it a



stimulant, of great activity; and, waving the disagreeable odour which the solvent elicited, it became decidedly objectionable as an application to the skin. But numerous improvements have been recently made in the manufacture of India Rubber cloth, and the process is conducted by means of rollers without the aid of any solvent; the inconvenience resulting from the bad odour is thus completely obviated. Yet, notwithstanding these improvements, it is improper to use the article as an under-dress, for even when made into sheets, the caouchouc is found to act so powerfully upon the skin, that a decided eruption is soon produced wherever it remains long in contact. This property, which prohibits its employment in health, bids fair to render it a very valuable remedy in chronic pains, rheumatism, &c.; for it acts as a slow, but powerful counter-irritant or revulsive.

Even as an external dress, the India Rubber should not be worn on ordinary occasions; for, being impervious to all moisture, a few hours are sufficient to render the other clothing damp and clammy with the precipitated effluvia of the person, which is not permitted to escape by evaporation. But, on all occasions when we are compelled to remain for a time exposed to unusual moisture, such as the mists of the morning and evening in cool weather, or when compelled to wade in the water, as in fishing or hunting, we can find no more perfect protection than a partial or complete over-dress of India Rubber cloth.

Having now completed a rapid review of the parts of the body which most require protection, and the character of the various kinds of material generally employed for dressing, we will close the present section with a few general remarks on the application of the principles laid down—for to descend into particulars, would be impossible within any reasonable limits.

Children, and old persons, require much warmer apparel than persons in middle life.

Exposures to sudden changes of temperature are dangerous every where; but cold, or even an air merely chilly, when combined with much moisture, is vastly more dangerous than when the atmosphere is dry.

Slight changes of temperature are much more dangerous in tropical climates, and in summer, than in winter, and in colder regions.

Exposure about sun-set, and before sun-rise, ought to be avoided by the delicate with more caution than is requisite during the day time or late at night;—and when any febrile epidemic is prevalent, this rule should be observed by all.

Undue warmth of covering at night, in hot weather, is pe-

cularly enervating, for it is then that the system is in the best condition for enduring, without danger, a moderate and invigorating temperature. But when the nights are subject to sudden changes, as they always are in the neighbourhood of mountains, it is proper that thin blanketing or some other woollen covering should be used above the sheets, and a neglect of this precaution has cost the lives of many invalids in situations otherwise well calculated to restore their health.

In extremely cold weather, the covering of the night requires to be much warmer than that of the day.

Warm clothing to the feet and lower extremities generally is one of the best of all preservatives against the ill effect of sudden exposure.

With the foregoing general rules once fairly impressed on the mind, the regulation of the dress in various situations and in persons of different constitutions, may be left with safety to the intelligence of the individual most interested.

*Of Cleanliness.*—We have spoken of the ill effects of clothing which, like India Rubber, is impervious to the sensible and insensible perspiration, but there is another mode in which the same arrest or retardation of the discharges of the skin is much more frequently effected. *Uncleanliness.*—Let not the fair or the fastidious reader be shocked by the allusion! Doubtless all those who move in the middle or higher walks will indignantly exclaim against a lecture upon a subject which it is deemed an insult to suppose neglected! We do not desire to offend, but our duty calls upon us to proceed. Of the actual accumulation of what is called *dirt* upon the surface of the body, little need be said; all but a *few peculiar theorists on the training of children*, to whose opinion we have already replied, are well aware that neglect on this point is both unhealthy and disgusting: but it may be well to mention, in passing, that the scrofulous and pulmonary diseases of the indigent and the slave, are rendered vastly more numerous by this neglect. The introduction of the public baths of the Romans would prove a noble charity at the north, and a matter of serious economy to the southern planter.

Let us pass to a subject less generally understood!—In the chapters on Anatomy and Physiology, the cuticle or scarf-skin has been described as an envelope not endued with vitality—a mere crust depending on the surface, and capable of transmitting moisture or other matters very slowly. It was described as thick and massive on parts designed to bear pressure, but peculiarly thin and delicate in certain places. Now it is perfectly well known to physicians that where the cuticle is thinnest, there the sensible and insensible perspiration flow most readily; there substances applied to the surface are most

rapidly absorbed into the body; and there also external agents act most promptly upon the nervous system. On the inside of the arms and thighs mercurial ointment salivates soonest; on the back of the hand, the forehead, arm-pit, and groin, exercise first calls out the flood of perspiration, and blistering plasters raise the most speedy vesication. Every thing, then, that tends to increase unduly the quantity of cuticle, disturbs the freedom of the skin in the performance of its active functions. The most important functions of the skin are the transpiration of moisture, &c., which removes unnecessary substances from the circulation; and absorption, which assists in changing the qualities of the blood, and, under certain circumstances, appears to contribute even to the nutrition of the body. If the transpiration be checked by the excess of cuticle, the lungs and kidneys, (the two other organs which separate the mass of the surplus fluids from the system,) are called upon for greatly increased exertions, and are consequently rendered much more liable to disease.

The human cuticle is not a permanent covering, but an incrustation of horny matter continually produced by the true skin, and intended to be as continually worn away by friction; but if protected from accidents by clothing, and its condition neglected, it is not worn away with sufficient rapidity, from most parts of the person;—on the contrary, it accumulates until the insensible perspiration penetrates it with difficulty, and the health is injured. To illustrate my meaning more fully, let us suppose a person remarkably careful of the appearance of face, hands, and nails, and *prodigal of soap*, whose weekly ablutions of the whole person are never neglected, but who employs a soft towel, and considers the principal object to be accomplished by *wiping*, to be the removal of moisture. Take this individual when fresh from the bath and “clean,”—rub him down well with a coarse towel, particularly on the back, the shoulders, the front, and the inside of the limbs,—then plunge both patient and towel into a fresh bath, and the water will be instantly rendered turbid or milky with the flocculi of scarf-skin, the most unhealthful of all *dirt*, washed from the surface of this fastidious personage!

It is of the utmost importance, especially with the delicate and sedentary, that a rough towel or the flesh-brush should be employed in bathing, and that it should be thoroughly applied to all parts of the person. This is even more conducive to cleanliness, good health, and spirits, than the most liberal use of soap.

At certain periods of the year, quadrupeds shed their hair; snakes, their skin; deer, their horns; and birds, their feathers;—man, also, sheds his coat in summer! It may be seen peal-

ing off in flakes from the forehead, the cheeks, and the backs of the hands. The season of this quasi *moulting*, is that at which such ablutions as are here described become most necessary.

Without entering at any length upon the subject of baths, we will here close the section with a strong expression of dissent from the opinion of those who approve of bathing soon after a meal. At such times, the cold bath does injury by driving too great a quantity of blood toward the bowels, and the hot-bath is equally hurtful by drawing too much of the circulating fluid to the surface; and thus both alike disturb digestion, the former by oppressing, and the latter by debilitating the stomach.

#### OF AIR AND MOISTURE.

The reader is already sufficiently well acquainted with the importance of the lungs in the animal economy, and will be fully prepared to appreciate the importance of every thing which relates to the quality of the air admitted into those extensive organs.

As presenting a vast absorbing surface, possessed of the highest possible degree of vascularity and vitality, the cavity of the lungs must be open to the most rapid action of poisonous substances, when they find admittance with the air necessary to the support of life. It is true that most of the gaseous or fluid substances which would produce rapid death by their presence in the lungs, are, when concentrated, refused admission, because their presence in the throat occasions an instantaneous spasm which closes the glottis, or opening of the larynx, (see p. 96,) and death, if it occurs, is caused by suffocation before the noxious article finds its way to the lungs. Thus, if a man fall into a brewer's vat when filled with strong carbonic acid gas, or if he fall into the water and is drowned, he dies before much of the gas has penetrated the larynx, and before any of the water has flowed into the lungs. It is only *after death* that the air passages become in a considerable degree filled by the foreign fluid. On the contrary, when poisonous gases are mixed with a considerable portion of atmospheric air, they find a much more ready access to the lungs, and consequently produce their peculiar effects upon the constitution. Some poisons, such as the fumes of ether, do not occasion spasm, and find entrance in a much more concentrated shape.

If a person immersed in water, or in any of the gases which close the glottis, be drawn from that situation before or very



soon after the spasm has been relaxed by the approach of death, there is always a reasonable hope of restoring the suspended animation, and if the patient recover at all, the health is seldom seriously injured. The cases resemble the effects of hanging, in most respects, except in the absence of the mechanical mischief done by the rope. When, on the contrary, the immersion has taken place in a diluted mixture of a noxious gas with atmospheric air, serious disease or death may follow after a considerable interval of time, even when the suspension of animation has been by no means complete. Among fatal accidents of this nature within the memory of the writer, are several in which the fumes of burning straw, the damp of wells, mixtures of air and carbonic acid, &c., have occasioned death, when the motion of the heart, occasional respiration, and sometimes even traces of consciousness, have continued throughout the whole period of exposure to the poison, and afterwards. The strongest of these cases was that of an unfortunate fellow-student, who died in a few weeks from the effects of chlorine gas, which he had imprudently inhaled in testing the smell of the fluid in the lecture-room. After an approach to fainting for a few moments, this gentleman rose and left the room, to which he never returned! If the admixture of considerable quantities of impurity with the air we breathe is thus capable of producing terrible effects, it stands to reason that even portions more minute, such as it is impossible to avoid, must exert considerable influence upon the health; and if farther proof be required of the extreme susceptibility of the lungs to impressions from without, it is only necessary to refer to the intoxicating effects of the hookah, and the dreadful mischief which frequently follows the silly practice of inhaling the fumes of ether.

These remarks are made, to awaken the attention of the reader to the influence of minute peculiarities in the character of the atmospheric medium in which we are placed; but their practical application must be directed in a great degree by the good sense of the reader; for it is utterly impossible to examine in detail the various dangers to which we are constantly exposed in regard to the properties of the air we breathe, and the mode in which we may guard against them. In the present work our remarks on this subject will be chiefly confined to some peculiarities in the physiological effects of air, resulting from states of temperature, moisture, and elevation; dwelling chiefly on such as have relation to the location, ventilation, and domestic arrangements of dwelling-houses.

From the days of Hippocrates, the father of medicine, down to very recent times, the prevalence of epidemics has been attributed to the action of poisonous effluvia contained in the air,

and supposed to be derived from the decomposition of vegetable and animal matter, and the emanations from the bodies of the sick. These effluvia have been termed *miasmata*, and each peculiar epidemic has been considered the result of its own especial *miasm*. The progress of Physiology, and especially the increased knowledge of nervous stimuli, and the advance of electro-magnetism, have shaken the foundations of this theory, or rather hypothesis, of miasm. The attempt is seldom made by medical philosophers of the present day to account for the varieties of fevers and other epidemic diseases, on the supposition that each variety is produced by a peculiar miasm; for it is now commonly conceded that the rapid and general epidemics owe their origin to causes more remote than any mere adulterations of the air. The term "*telluric influence*" has of late been extensively employed to express this remote predisposing cause of disease, which seems, at intervals, to modify the nervous action or vital power of the whole animate creation, and enables the same exciting causes to produce various effects at different times; but this term is really a mere name for what we do not understand; and like all other words substituted for things, has done considerable mischief. Some theorists now contend that no peculiar effluvia are necessary to the production of fevers, and that the only circumstances connected with the condition of the air which exert any material influence in exciting such diseases, are *temperature* and *moisture*. But granting all the vast importance of these circumstances, the whole history of endemic diseases, or those appearing regularly or constantly in certain situations, should demonstrate in a manner quite satisfactory to the minds of philosophical inquirers, that, independently of all epidemic changes, and all varieties of temperature and moisture, there are vitiations of the air, resulting from animal and vegetable decomposition, fully capable of producing febrile disease. Miasms thus engendered may be blown about by the winds, and may thus do mischief at a distance from the place of their formation; they may be elevated to the upper regions by the heat of the sun, and precipitated by the coolness and dews of evening. Truly, these miasmatic exhalations will not explain the differences between epidemics or the mode in which they are extended—for these diseases often spread in the face of the wind, and in a manner which cannot be explained by any known atmospheric revolution. But miasmata are not the less certain *causes of disease*, because they do not determine the nature of the disease which they generate. They make the patient *sick*, and leave it to the peculiarities of climate and location, or the nature of the reigning epidemic *to determine the character of that sickness*. The same miasm which in

one place excites an intermittent fever, shall, in another, provoke a dysentery! That which in one year brings on a yellow fever, may, in another, give rise to Asiatic cholera!

It follows, then, that the location and ventilation of a residence is a matter of the utmost importance to the health of the occupants, and that after the temperature and the degree of moisture are duly regulated, it is proper to guard against miasms with the greatest care.

The effluvia generated by vegetable decomposition are believed to be readily precipitated by moisture; hence the dews of the morning and evening, the mists of the spring, and more especially the autumns, and the first showers of the rainy season in tropical climates, are rendered peculiarly dangerous to health, because they apply, both to the skin and to the surface of the lungs, a watery vapour charged with miasmatic exhalations. By following the diurnal variations of temperature, we shall at once perceive the reason why exposures in the middle of the day and late at night are so much less hurtful than those to which we are subjected during the morning and evening hours. At night, in most situations, the free moisture of the air, together with the miasm, is chiefly precipitated upon the ground, so that we walk over the prostrate enemy. At mid-day, on the contrary, the unhealthy effluvia are immediately heated and rarefied by the sun's rays, so that they ascend, with the air, into an elevated region, leaving us to walk in safety under a canopy of disease!

Our country contains many valleys which are proverbial for their unhealthiness. The traveller should never pass these districts until the sun has illuminated, for a few minutes, the whole extent of the plain, or, in other words, until the curtain of poisoned air has been lifted from the low grounds by the warmth of day. If compelled to pass the night in such a region, he should at least retreat to shelter before the sun has set, and protect himself by artificial means against the dangers to which he is exposed by nature.

It appears probable, (to speak in the most cautious manner,) that vegetation—which, in its decay, produces by far the greatest amount of miasm—when vigorous, subsists upon and destroys it. This result is no doubt in a great degree owing to the action of the roots in absorbing the elements of decayed plants beneath the soil, but it is at least equally certain that the stems and leaves of living vegetables inhale the same effluvia to an incalculable extent. Our American forests are almost universally remarkable for their healthiness in their primitive state. The most noxious portion of the gases eliminated from the dead leaves is immediately absorbed by their living successors. The tree, the vine, the shrub—even the

grave festoons of moss, and the humbler lichens and mushrooms, all contribute to preserve the fitness of these gloomy wilds for the residence of savage or adventurous men. But when the sturdy settler grapples with the Majesty of nature in these, her chosen haunts, deeply does she revenge the desecration of her altars! The green robe has scarcely fallen from the girdled tree ere the demon of disease is busy with his victims. The summer sun plays fiercely on the damp soil, in whose bosom the elements of destruction have slept innocuously for ages. They rise, and the unthinking farmer whose first effort destroys all vestages of tree or plant around his log hut or his boarded cabin, lies wholly at their mercy! The pale planter of the low grounds goes shuddering to his labour with yellow cheek and watery eye. The more vigorous woodsman of the height sinks under the slow sapping of hepatic diseases, from which his very cattle cannot escape!\* and the denizen of the nascent city of the south-west, falls suddenly beneath the terrible plague of the tropics,—the dreaded yellow fever! But these evils are, in most situations, merely temporary. In a few years a large proportion of the destructible vegetable matter in the soil is dissipated. Sometimes, though, alas! too rarely in our country, a few young trees are planted round the dwelling, and finally, the harvest, the cultivated garden, and the fields of grass supply the place of the primeval forest and destroy the remaining miasm, as it is formed. The offended dignity of nature is appeased, and Hygiea reigns once more over a hardy yeomanry, whose dames and daughters display the roses of their well rounded cheeks, glowing through the nut-brown tint of health!

Almost the only places in which the evil influence of miasmatic exhalations resist more permanently the effect of those causes which have just been pointed out, are the broad and rich bottoms of those rivers which periodically overflow their banks, increasing the fertility of the earth at the expense of the health and life of the cultivator. In such situations the depth of the soil renders it incapable of exhaustion, and the annual addition of destructible matter exceeds the demands of the most vigorous vegetation. Here, then, the sources of disease are continually exerting their energies, and ages may prove necessary to paralyze their power. The strongest natural examples of this character, in our country,

\* During a residence of a year in north-western Pennsylvania, the writer was astonished to find ample verification of a fact mentioned to him by an intelligent settler, namely, that all the cattle of the district, though thriving in appearance, were affected by softening, abscess, or worms in the liver. He examined many oxen destined for the table, and found them invariably in the condition described.



are seen in the low lands of the Ohio and Mississippi;—the most remarkable artificial instances may be found in the rice plantations of the South.

On a smaller scale, a certain degree of permanence is given to the unhealthiness of districts by the vicinity of extensive swamps in which the water is occasionally raised by unusual rains, the existence of considerable flats on the margin of fresh water estuaries, and even the construction of mildams in level countries. The description of the artificial means by which these evils may be counteracted is foreign to the purpose of this work, but it is right to mention that for several years after the draining or embankment of such tracts, the unhealthiness of the surrounding country is generally increased by the direct action of the sun on the remains of vegetation; though the ultimate benefit far outweighs this temporary ill consequence.

Even after the entire clearing of a district of country, though the excessive miasmata may be no longer generated, the more fertile portions still give rise to poisonous effluvia—insufficient, perhaps, to engender disease under ordinary circumstances,—but powerful enough to produce very serious consequences when epidemics prevail in the neighbourhood. Effects of this character are so frequently observed, that it might almost be established as a general rule that *the more fertile the soil, the more sickly is the district*; although by an apparent contradiction, the vigour of vegetation is the chief protection of human life in such situations! The settler should remember that “*bane and antidote are both before him*,” and the application of philosophical principles to the selection of a suitable residence is every where important.

The first point to be considered in the location of a dwelling-house, is its elevation. It should always be placed as high above the level of the neighbouring water-courses as circumstances will permit. By this precaution we secure ourselves, in a considerable degree, against the influence of miasm in its most concentrated form, and that in which it acts at the greatest advantage; namely; when held in solution by the moist exhalations or diurnal mists of the low grounds. It is a fact well known in tropical and swampy countries, such as the Dutch East India settlements and the delta of the Ganges, that the second story of a house is vastly more healthy as a residence than the lower rooms; and there are two situations in temperate climates, in which attention to this circumstance might prevent much misery and loss of life. 1st. In the country; when houses are built on low or inundated lands where endemic fevers prevail, there is not only a greater chance of escaping an attack when the family is located on the second floor, but the disease, if it should appear, is often much

more manageable in the upper rooms. 2d. In cities, where the diseases of childhood—and especially the cholera infantum, that terrible scourge of infants which often yields immediately to the influence of country air, when all other measures fail,—these diseases, I say, are often cured in the second story of a dwelling, in cases in which such a result could not possibly occur if the little patients were confined below. The only exception to this rule is found in houses with thin and unprotected roofs, such as are usually found in America, where domestic architecture is neither adapted to the climate of the torrid, nor to that of the frigid zone, though our climate, in most places, presents alternately the extremes of both! The upper story is too frequently placed under the immediate influence of the heat of the roof in summer, when the direct rays of the sun convert it into an oven, the heat of which is scarcely tempered by the interposition of a low and ill ventilated attic or loft. We have had occasion to witness, in several cases, the occurrence of the most severe and rapid fevers of hot climates, produced artificially in temperate districts, by the increase of temperature resulting from this obvious and gross error in the construction of buildings. The genuine malignant cholera, the concealed abscess of the liver, the inveterate bloody dysentery, the spontaneous lock-jaw, &c., complaints familiar to those who have practised in Batavia and Calcutta, have been observed, from time to time, in the ill-constructed buildings about the brick-ponds in the environs of Philadelphia; but we have never met with cases of this character, except during the prevalence of epidemics, or in patients who are lodged within the direct influence of a heated-roof.\*

Having laid down a general rule with regard to the importance of an elevated site for dwellings, the next point of interest is the form of the ground plot, and the nature of the soil on which the building, the garden, &c., are located. Every precaution should be observed in avoiding the presence of undue dampness, on the accumulation of decaying vegetable mat-

\* It is really astonishing that the evil effects of the usual arrangement of the roofs of dwelling-houses have been so generally overlooked! The remedy is very simple. A few orifices beneath the eaves to admit the external air between the shingles and the ceiling or floor of the loft, together with a couple of covered ventilators on the ridge of the roof, would at once establish a continued current of air in warm weather, and the surplus heat would thus be conveyed away by an apparatus put in motion by itself. This plan could be prevented from producing any inconvenience in colder weather, by simply closing the ventilators; and, in the dead of winter, the orifices beneath the eaves might also be plugged up if necessary, and thus the residents would be possessed of ready means for moderating both the heat of summer and the cold of winter, in the upper stories of their dwellings.

ter in the immediate vicinity of the house. The ground should be naturally drained, as far as is consistent with fertility. Neither stagnant ponds, nor water-courses subject to irregular floods, should be near, and the foundations of the building should be decidedly higher than any neighbouring water level. Unfortunate necessity can alone excuse the location of a house upon a substratum of clay, and such a site can never be rendered healthful but by artificial draining,—a plan far too expensive for general adoption in agricultural districts, unless the clay should be found to overlay a stratum of gravel.

There are many wide tracts of fertile country where this rule cannot be observed, as the geological structure of the neighbouring rocks converts these districts into what are commonly styled *basins*, and draining is then rendered extremely difficult or absolutely impossible.

The form of the neighbouring heights; and the prevalent course of the vernal and autumnal winds should always be consulted in the selection of a residence.

East of the Allegheny range of mountains the breezes of the spring and autumn are generally from the south and west; consequently, it is much safer to reside on the south and west margins of water-courses and swamps, than to be located to the north and east of them; for, in the former case, the miasms are blown away from the dwelling, while in the latter, they are continually directed towards it.

In many places, the heights which border upon rivers and low grounds, are arranged in such a manner as to arrest the southerly breezes, with the miasms which accompany them, and give them a northern direction along the intervening gullies, often concentrating the miasms and inundating narrow tracts of land in more elevated, and apparently healthful positions, far removed from the source of the poisonous effluvia. The heights above Fairmount produce this effect in a very obvious manner; the miasms of the neck below Philadelphia are driven by the south wind up the Schuylkill, and striking against the hills just mentioned, are driven across the ridge between the Schuylkill and the Delaware, in a direction almost at right angles to the wind, often carrying disease over a narrow belt of highland, while the inhabitants of all the surrounding country are in the enjoyment of comparative health. Such situations should be carefully avoided by settlers when circumstances allow them a chance of selection.

One of the greatest protections against the ill effects of miasm is a row of young and vigorous trees, near the dwelling, which should always be planted at the distance of a few hundred feet on the side next the principal source of the poison.

With a few remarks on certain means of regulating the temperature and moisture of dwellings, which appear not well understood amongst us, we will close the present section.

In England every little cottage is surrounded with verdure. The honey-suckle, the eglantine, and the clematis intertwine their branches around the door-way and form festoons above every window, while the ivy covers the blank wall with the best of all protections against the rays of a basking sun. How barren and cheerless in comparison is the aspect of those unmeaning piles of logs, boards or bricks, so often in our land miscalled a home! But taste and beauty are not the chief recommendation of this species of ornament. Waving the inestimable moral advantages of cheerfulness, and that expansion of heart, which a fondness for the gems of Flora invariably bestows, the horticulture of cottages is a subject of great hygienic importance. A dense mass of foliage covering the walls of a building in summer, reduces the excessive heat within doors, and equalises the temperature of the day and the night. In this manner it lessens the risks of disease, and renders an attack less dangerous. The ivy, so commonly employed in Europe, where families remain fixed in one situation for many generations, is a plant of very slow growth, and entirely unfitted for the wants of our restless and ever-changing countrymen. It is also liable to another serious objection,—that of rendering walls damp, and destroying our shingle roofs. But nature has given us a vine which grows in great profusion in all our forests, most admirably adapted to the purpose of protecting houses, whether built of bricks or wood. It is the common creeper, (*ampilopsis americana*), often mistaken for the poison vine, from which it differs in having five leaflets, instead of three, upon each footstalk, and in adhering to surfaces by means of long tendrils with terminal suckers, instead of bundless of short roots shooting directly from the stem.

This plant will often cover the entire side of the largest houses in four or five years, it turns much of the rain, and imbibes the atmospheric moisture, rendering the wall peculiarly dry. It will not adhere to the painted eaves nor to the frames of windows, from which its long branches sweep downwards, forming graceful festoons and curtains. The general introduction of this plant would add vastly to the beauty, but still more to the health of the country.

The manner in which too much moisture in the air promotes disease, has been sufficiently described already, and it is in the mornings and evenings, during the moderate weather of the spring and fall, when miasms are most rife, that the moisture of the air is greatest.

Those periods, then, require the most careful attention to



be paid to the artificial temperature of dwellings. When air is heated it unites with a larger portion of moisture, rendering it comparatively innoxious. Hence, whenever the temperature of the mornings and evenings becomes suddenly diminished, fires should be lighted in the sitting room, and the members of the family should be removed as much as possible from all exposure, from sunset until ten o'clock, and from daylight until after the morning meal.

By strict attention to the details pointed out in this section, particular families have escaped for years the encroachments of miasmatic disease, though resident in the midst of districts suffering under the most terrible endemics. Instances have been witnessed among the fens of Italy, the fogs of Holland, and the fertile bottoms of our own sea-like rivers.

#### OF EXERCISE.

The advantages which flow from exercise are so universally advocated in town and country, palace and hovel, that it seems almost a work of supererogation to speak of them here. A little inquiry, however, will convince the observer that much as healthful exercise is praised it is but little understood. If we attempt to advise a dyspeptic shoemaker that he stands in need of free exercise to remove his disease, he will probably display his well developed arms and broad shoulders, and neglecting his slender or dropsical legs, and his sallow or swelled countenance, will triumphantly prove your ignorance by informing you that he works from morning till night, and retires to bed exhausted with fatigue! In many, this will excite a smile, but it is easy to quote examples of the same kind of reasoning in those whose wealth and opportunities should teach them better. The merchant's salesman, whose daily duties call for continued physical exertion, in superintending if not immediately executing the removal of packages and goods from place to place, considers himself exempt from all charge of neglecting exercise, forgetful of the fact that free air is necessary to the revivification of the blood, which is driven in a rapid current through the veins whenever we use exertion, but which cannot supply the force or vital energy required to render exercise serviceable, without a constant and increased supply of the purest air. By the neglect of this supply, exercise instead of increasing the energy of the system, is converted into a mere means of useless exhaustion. Equally irrational is the practice of many well-meaning parents, (sometimes countenanced by the physician,) of confining the exercises of their daughters to the duties of a household,—under

improper notions of cultivating domesticity. How often, indeed, do we see poor, pale, etiolated girls, with swelled feet, haggard looks, and attenuated extremities, but with broad, round shoulders, unduly developed by making beds and scrubbing furniture, yet deprived of the breath of Heaven and the cheerfulness of society, under the idea that woman's duties should be centred in her home, and that exercise and freedom from improper exposures are the best securities against the loss of health and the deterioration of morals! Annually are numerous victims among the wealthy and the lovely sacrificed to this preposterous application of laws in themselves correct!

Exercise, to be serviceable, must be taken in the open air, and it should never be carried so far as to produce exhaustion.

Those exertions which call for the action of particular sets of muscles, if long continued without change, invariably tend to produce deformity. From this cause result those peculiarities of form which characterize particular trades—and it should not be forgotten that these peculiarities are invariably marks of irregular nutrition, and consequently increase the liability to certain diseases. Almost every trade has some besetting affection which attacks its followers more frequently than other men.

In order, then, that muscular activity, (to which the term exercise is commonly restricted,) should be made conducive to health, it is necessary that all the muscles should be employed so frequently as to give each set its proper development and to preserve the balance of the system. Deformities resulting from the undue or deficient exercise of particular muscles are almost always curable by systematic exertion—but so little are the principles upon which exercise should be regulated, understood by the mass of society, and even by those physicians who seldom encounter surgical cases, that most of the popular modes of attempting the correction of such evils, have a decided tendency to increase them. Thus, if a girl be round-shouldered, or given to stooping, owing to debility of the muscles of the back, or too great development of those on the front of the chest, her parents apply corsets or braces, which by supporting the head and shoulders artificially, produce still greater weakness of the back for want of use; she is then, perhaps, directed to scrub furniture to invigorate her constitution, by which means the anterior muscles are rendered still stronger, so that the deformity is rapidly increased by two different processes, both instituted for its cure! The only rational remedy for stooping is the frequent application of a force which tends to draw or thrust the shoulders or head

still farther forward; for the necessary resistance to this force will always increase the tone and size of the weakened muscles; and the only precautions necessary in employing this principle in all cases where there exists no serious disease of the bones, are, 1st. to avoid fatiguing the weakened muscles by continuing their action too long, for this will cause a loss of power; and secondly, to allow sufficient rest between the exercises. This latter precaution requires one word of comment. It is not during the actual exertion of any organ that its strength is increased—but stimulation produced by the exertion notifies the system, (if we may be permitted this personification) that additional nutrition is necessary in that part to enable it to meet the demands upon it, which, having been made once and again, are likely to be repeated frequently.

A horse, or a man, on a long journey, actually loses flesh; but the journey once completed, and rest with a liberal diet allowed, he rapidly increases in strength and size.\* It is during the rest which follows exercise, that the muscles become enlarged and strengthened. It has been already explained in a former chapter, that no part can retain its energies if constantly exerted; or, in other words, if acted upon by a constant force. Hence, excessive exercise may be occasionally employed with advantage in certain surgical cases where the exhaustion of a muscle becomes desirable; but this subject is placed beyond the domain of Hygiene.†

In the foregoing remarks the reader will find the elements of the theory of gymnastics, but it would be folly to attempt to describe the applications of this much neglected art, within the limits of such a work as the present. The knowledge and intelligence of the most accomplished surgeon may often be employed in determining the proper course of exercise for unusual cases, and with a degree of benefit for which no money can compensate; for the management of such cases often requires an extent and accuracy of anatomical and physiological research which can only be effected by professional men of the highest qualifications. But the common good sense of mankind will enable all to apply the principles laid down, to the every-day business of life, and to that good sense we will now commit the subject, after a few remarks upon the folly of those who oppose some of the most useful exercises, in consequence of the evils following their abuse.

There are certain sectarians, and many conscientious indi-

\* This idea, carried out by the physiologist, would probably explain the whole theory of habit, and in conjunction with the influence of hereditary peculiarities, would go far to explain the apparent varieties of most of the races of mankind.

† Surgeons will perceive that extension in luxations acts on this principle.

viduals who exclaim against particular amusements on account of the evils to which they are supposed to lead,—though those evils have no direct connexion whatever with these sports. “Late hours and suppers are in the highest degree injurious. Dancing leads to late hours and suppers,—therefore, dancing is in the highest degree injurious.” Such is the logic by which the most innocent pastimes are frequently attacked, but when such things are regarded with the calm eye of reason, there will be found no connexion between *dancing and dissipation—fencing and ferocity—boxing and blackguardism*, other than that which is presented by their initial letters! The time occupied in the acquisition of these accomplishments, the supposed waste of which induces many worthy people to oppose them, is in reality well spent, for it is occupied in reducing to a science the proper exercise of most of the muscles of the body. These arts are among the most important means of health, muscular vigour, grace, and accuracy of movement; and the practice of them, rightly regulated, conduces alike to the powers and safety of the sailor and the hunter on the one hand, and to the skill and delicacy of touch of the artist and the operating surgeon on the other. The public health would be incalculably promoted by the foundation of well organized gymnasia in every considerable school and town;—and even on large plantations the trifling expense attending the necessary fixtures would be amply compensated by the increased productiveness of labour, and the cheerfulness of servants. This last position may seem strange to many, for the fatiguing labours of the plough or the scythe might naturally be supposed to destroy all zest for unnecessary exertion on the part of the agricultural labourer; but the slightest observation of the habits of the farmer’s boy will convince us that athletic exercises are sought with avidity even as a relaxation from the severe discipline of the harvest field! and the reason is obvious. Running, leaping, the games of prison bars, wicket, fives, &c., call into action all those muscles which are unemployed in ordinary agricultural labour; thus acting as an actual relief to the exhausted organs according to the laws of counter-irritation, and preventing, also, the deformity which inevitably results from ill-regulated labour.

The influence of voluntary exercise upon the mind, and the physiological reaction of the mind upon the body, render these sports infinitely more conducive to health, than the efforts which are made in the simple discharge of duty; so that in choosing an operative in business, it is one of the best of rules to select the youth who plays best, for he will be found almost always to work best! His occasional truantship will



be more than compensated by his greater availability while on duty.

Muscular exercise, as a counter-irritant, now requires a passing notice. It is in this capacity that it acts as an antidote to dyspepsia. The increase of nutrition, and, consequently, of vital energy in so large a portion of the body as the muscular system, must necessarily tend to lessen very materially the undue excitement of any internal organ, such as the stomach in dyspepsia, but it is a mistaken notion that those who lead an active life are entirely protected from this distressing affection. Dyspepsia is often, if not generally, a consequence of habitual debility from the over-exercise of the stomach, and it is unreasonable to suppose that the evil can be entirely removed by bodily activity, while the stomach is still subjected to the original causes of the disease. Exercise to any great extent may even occasion an increase of dyspepsia in certain extreme cases, for it tends directly to draw off from the internal organs a portion of the vital force already deficient in the stomach, it should therefore be used with caution, and its effects should be carefully watched.

One of the most beautiful effects of exercise as a counter-irritant, is witnessed in the systematic management of many affections of the mind, which, though often distressing, do not surpass the bounds of health; but its proper application to such complaints receives very little consideration, even from physicians. The over-exertion of any set of mental faculties produces in the part of the brain in which the organs of these faculties are seated a condition parallel to that of the stomach in dyspepsia, and one curable according to the same laws.\*

Men of literary professions are constantly liable to the ill effects of such partial exertions of mind; and dissipated men are subject to even more serious dangers from the undue cultivation of the instinctive feelings. In the former, the mind is directly threatened, and in the latter, the bodily powers are overthrown by nervous derangements which frequently produce the most terrible gloom and distress, followed sometimes by convulsions and a gradual loss of intellect.

There are two modes of exercise by which counter-irritation may be produced in a manner highly serviceable in these local affections of the interior of the brain and cerebellum. First;—by employing other portions of the brain while those which are over-exerted are allowed to remain at rest, we di-

\* Here, as in several other places, we use the language of the phrenologists, because, whatever may be thought of their doctrine, it is now universally granted that their terminology conveys the clearest ideas of the relation of the facts observed by students of the physical operations of the human mind.

vert the vital forces from the diseased to healthy organs. Thus, the study of natural history constitutes one of the best remedies for threatened insanity or deep gloom in poets and metaphysicians: that of mathematics alleviates the distress resulting from wounded feelings or illicit indulgences. Secondly;—by exercising all the muscles we expend a large portion of the nervous energy, and thus temporarily diminish the functional action of the whole brain, while we more permanently enlarge one of the principal systems of the organs, and restore the balance of nature by calling forces from the head toward the extremities. We have seen hereditary insanity held in check for many years by such measures, rightly directed; and we have repeatedly cured the established habits growing out of the tyranny of the most engrossing passions by the same process. Exercise, then, not only improves health, in the common acceptation of the word, but the feelings and the morals also, a healthy condition of which is absolutely essential to the comfort of the individual. To neglect the physical means of cultivating the moral relations of life is to outrage the rights of society; and consequently, a neglect of systematic exercise may become an offence against religious duty! We commend this subject to the reflections of those who are the appointed guardians of public virtue.

It is unnecessary to enlarge upon the subject of exercise in other organs and systems, for the same principles which are applicable in the case of the muscles are equally so in that of any other organ, whether its function be mental or mechanical.

Entire rest of any part allows its power to be lost for want of use; regular employment strengthens it and renders it larger; too great exercise may occasion undue development, and subject the part to disease. Still greater degrees of exertion produce, first, irritation, then debility, then a temporary or total destruction of power. The exercise of one set of organs calls off excitement from all others, and too great development of one set occasions a dangerous destruction of the balance of the system. After having carefully perused the remarks contained in the chapter on Physiology, these hygienic laws will be entirely intelligible to the reader. We can but indicate them here, leaving their application to himself.

The title of *passive exercises* has been given to those recreations in which the body is agitated by any foreign force, independent of any exertion on the part of the individual. Of this class, we may enumerate, in the order of their activity, swinging, the see-saw, sailing, carriage-riding, riding on horseback, and jolting in wagons. The slight influence of these exercises

upon the muscular system being thrown out of the question, their results depend mainly upon their influence on the circulation. And this is one of the most beautiful mechanical problems involved in physiological reasonings.

Whenever the body ascends, the fluids in the blood-vessels at first attempt to lag behind because of their inertia, and the veins and capillaries of the lower portions of the body are consequently distended, until the whole mass of fluids acquires the general movement. Then, the moment the upward motion ceases and the body begins to descend, the circulation becomes more rapid by the contraction of the elastic vessels, relieved as they are at once from the inertia of the blood contained within them. Descending with the body until it reaches its lowest depression, the blood continues to flow toward the heart, not only by the natural force of the circulation during rest, but by the continued elastic contraction of the distended vessels; but, at the same time, it acquires its share of the general descending movement of the whole body; and when the latter begins suddenly to ascend again, the blood still endeavours to fall, until it is checked with a jerk by the coats of the distended vessels, and the reaction of these not only occasions a full and complete dilatation of the last ramification of the capillaries, but produces a sudden jet toward the heart, followed by a rapid current in the same direction. The heart, thus filled with more facility than under ordinary circumstances, contracts more speedily, and the pulse becomes quickened. If the passive exercise be carried too far, palpitation may be produced; and if any particular part be excessively weakened—or if any one organ be affected with irritation, inflammation, or their consequences—this quickened circulation, so general in its influence upon the whole system, may considerably increase the danger of local disease, and must be governed with prudence and caution in cases of patients debilitated by long-continued illness. But with this circumspection, how incalculably beneficial are the results of passive exercises during long and tedious convalescence! How vastly do they reduce the dangers of relapse, or that utter destruction of the energies of the system which so frequently supervenes upon it! Even in health, these amusements give energy to all the animal powers, and fortify us against the encroachments of disease. They should be encouraged by all, but especially by children. They are the proper *exercises of the circulation*. The results of a sea-voyage, and of many childish sports, both upon the health and temper, are at once explained on the principles just laid down.

Under the head of deformities, and that of women within

the month, will be found some precautions with regard to exercise under peculiar circumstances—and with these remarks we submit the subject to the good sense of the reader.

### ON THE FOOD AND EXERCISE OF CHILDREN.

Very few persons are aware of the thousand ills to which we are subjected, during life, by the misplaced kindness of parents, or the carelessness or inhumanity of those who *should* be the guardians of our infancy.

The mismanagement of food alone, in childhood, lays the foundation of long-continued sufferings, or seriously diminishes the comforts of a large portion of the human family, and we should be guilty of great neglect if we were to pass this subject unnoticed; especially as it is one upon which the principles of physiology, applied by the aid of a little common sense, are capable of shedding the clearest light.

Milk is designed by nature for the nourishment of the young of all the more perfect animals during the first stage of their independent existence. Now it is well known to every housewife, that the internal membrane of the stomach of an animal, even when dried and made into rennet, will convert milk from a fluid into a solid substance, which, when allowed to remain for a considerable time undisturbed, becomes more and more tenacious by contracting, like the coagulum of blood, and forces out its more fluid particles in the form of whey, while the remainder becomes more and more analogous to cheese. This last substance, when fully formed, is well known to be peculiarly difficult of digestion, and can only be tolerated by the human stomach after having undergone thorough mastication. The fate of one whose stomach should be completely filled with a *solid mass of cheese* might be easily foretold. It would be inevitable death from the same cause which is known to destroy life when large quantities of fluid blood are taken into the stomach and allowed to coagulate there. Yet this coagulation actually takes place whenever milk enters the stomach of a living animal, and the same tendency to form a mass of cheese immediately displays itself. If the quantity taken were large, and it were possible for the function of digestion to lie dormant for forty-eight hours, under such circumstances, there would be serious danger of death from the inability of the stomach to act effectively upon the tough substance within it. Fortunately, nature has secured to this most important organ of organic life, the power of acting immediately, and for a long time consecutively, upon any digestible ma-



terial; yet here, as in every other part of the system, alternation of rest and exercise are indispensably necessary.

We find that the free use of milk unmixed with other edible matter, can be tolerated by very few adults, except those who lead a laborious life in the free air, and whose stomachs are thereby endowed with enormous powers of digestion.\* The reason of this must now be obvious to the reader. Though not absolutely indigestible, milk is exceedingly difficult of digestion in a grown animal; it remains a long time upon the stomach, the centre of the coagulum continually growing firmer and firmer until, toward the conclusion of its solution, it resists most pertinaciously, and the stomach becomes exhausted, and often permanently weakened by the effort to digest it.

But, it will be asked, how then can milk furnish the only proper diet, and the most healthful nutriment of early childhood? Plainly for three good reasons. The stomach of an infant possesses much less coagulating power, and the central portions of the quantity taken remain much longer in a fluid condition than they do in grown persons. In proof of this, it is only necessary to state the fact, that infants often discharge fluid milk from the stomach hours after it has been taken, but adults, when affected with vomiting, expel it perfectly coagulated, even in a few minutes after drinking it. The adult generally takes a considerable quantity at a draught, and forms one great coagulum at once; the infant, on the contrary, imbibes it slowly, and produces partial coagulation of small detached portions which are much more manageable. Nature even corrects the errors of appetite in the infant, for if an undue quantity of milk be taken suddenly, as is often the case when *the bottle is employed*, the child soon afterwards ejects the surplus in a fluid state, and relieves the stomach of the injurious load. The occurrence of this species of vomiting is justly regarded by nurses as a sign of health; it is seen most frequently in those infants whose stomachs are in the most vigorous condition, but, I believe, never occurs in the adult. Lastly; digestion, like all the other organic functions, is carried on much more rapidly in infancy than in adult age, and

\* As milk furnishes an admirable diet, when properly managed, in some few cases of dyspepsia, and in many pulmonary affections, it may be well to mention in this place a very singular fact. If to a quantity of milk we add a very small quantity of farinaceous matter, (say a tea-spoonful of flour to the gallon of milk,) and if the mixture be then heated to the boiling point and again suffered to cool, it will be found deprived of those properties which render it noxious to the adult stomach. It may then be taken freely by those who dare not partake of milk in its natural state. The whey, when expressed, appears to be a healthful beverage at all ages.

the coagula, or rather flocculi, in the stomachs of the former are finally removed long before they have had time to contract sufficient firmness to offer resistance to the natural actions of the organ.

The change in the functions and powers of the stomach, as the infant advances in age, is gradual, and a corresponding change is effected in its natural nutriment. The mother's milk, during the first few months, possesses very different properties from those which it assumes toward the end of the year, being, at first, much less perfectly coagulable, and containing a much larger proportion of whey. Hence, one of the chief reasons of the comparative superiority of development displayed by children raised by the mother over those who depend upon a wet-nurse, the latter class of assistants being generally chosen from among those who have lost their own children, or have been compelled to relinquish the care of them after several months from the period of birth. Hence, also, the still greater evils resulting from the use of the bottle in rearing young children;—the milk of the cow being much less perfectly adapted to the wants of the infantile stomach at any period, than is that of the human breast.

Between those periods in which milk, as an article of diet, is to be considered healthful in the one and injurious in the other, there is a time at which a change in the habits of the infant becomes necessary to the preservation of its health, and the neglect of this important moment is a fertile source of early death or permanently debilitated constitution. This remark brings us to the subject of *weaning*.

WEANING should take place about that epoch in the life of the infant at which the stomach has become so far changed in function that it begins to coagulate milk speedily and completely, and when the masticatory apparatus is sufficiently complete to fit it for acting upon solid food. This period, no doubt, varies greatly with the temperature of the climate and local position. Among the Samoedes and other extreme northern tribes who, from motives of pure charity, inter the infant with the dead mother that they may not see it perish by starvation, the development of the human body is long protracted. The women are said to be rarely marriageable before they reach the age of twenty-five years, and it is reasonable to conclude that the earlier progress of the infantile functions is in like manner retarded; hence the practice of suckling children for several years, which prevails from necessity in those inhospitable elimes bordering upon polar regions, may there be found consistent with the health of these unhappy people.

Far different is the state of things within the tropics. There, women are often marriageable at 10, 11, or 12 years of age.

and the physical and mental development of the infant is proportionally rapid; consequently, the proper time for weaning is considerably earlier than in temperate countries. The United States comprise a vast range of climate, and the law which would prove correct in Maine could not be safely followed in Mississippi.

It is both impossible and unnecessary to designate any precise period at which the weaning of an infant is imperatively demanded, but it is easy to establish extreme limits beyond which it is highly imprudent to transgress. In the middle states these limits may be placed at 9 and 15 months from birth. If circumstances oblige us to remove the child from the breast at an earlier moment, the consequences are always troublesome and often serious; and if the mother continue to nourish the child beyond the latter period, the effect upon the stomach is always injurious, though the consequences, in such cases, are very rarely attributed to the real cause. The false tenderness which induces some parents to neglect the weaning of children until eighteen months or two years, is altogether inexcusable, and the intelligent physician must condemn, even while he pities the motives which occasion similar practices to a much greater extent among the poorer class of society. There exists, however, one prevalent opinion which demands farther notice. It is generally thought that the dangers of the second summer are much enhanced by premature weaning, and that sickness or general debility of the infant interdicts the attempt to change so entirely its natural habits. "I cannot wean my child, *now*," says some affectionate mother of a child twelve or fourteen months old in May. "It is so feeble, and it has to go through its second summer! If it were to die, I should never forgive myself! Oh dear!—Doctor, I cannot take from it its natural food!" Now, as it is acknowledged to be improper to wean in very warm weather, because the extreme excitability of the young fibres at such times renders the slightest irregularity dangerous, the unfortunate infant to whom allusion has just been made, is condemned to the breast until the succeeding October at least; that is, until it reaches the age of seventeen or nineteen months. In this case, the anxious mother is correct in her principles, but she strangely misapplies them in practice. The milk which constituted the "natural food" of the child, when under the year, becomes *unnatural food* when it passes that epoch, and the feeble infant, compelled to combat all the ills of the second summer with but slender powers of resistance, is forced, by mistaken kindness, to admit daily into its stomach quantities of a fluid which becomes daily more and more difficult of digestion! The consequences of this mistake are in a high degree serious,

and there can be little doubt that the proverbial mortality of childhood is much increased by it. In our climate the age of twelve months is, as a general rule, the best period for weaning. If a child be eleven months old at the end of the month of May, it should be deprived of the breast about that time, rather than that it should be subjected to the evils resulting from the continuance of its previous habits to the age of sixteen months, when the weather would again become favourable to the undertaking. But if only nine months old, or less, at that time, it is better to delay the weaning until the succeeding October.

Though the proper period for weaning varies in different countries, nature has furnished us, in the dentition of the infant, with an unerring guide not only in choosing the moment for this operation, but also in regulating the after habits of the child as it increases in size and strength; and it is a matter of astonishment that this circumstance should be so seldom touched upon by hygienic writers. Every reader is doubtless aware that the human jaw is provided with three distinct groups of teeth for the purpose of masticating the different kinds of food employed by omnivorous animals, but it may not be so generally known that naturalists are able to determine the kind of food requisite for any quadruped by the simple examination of the teeth, without previous knowledge of its habits. Now, it is not only true that nature provides nothing in vain, but it is equally indisputable that she provides nothing out of its proper time and place, so long as her efforts are uninfluenced by accident or indiscretion. The few quadrupeds which, like the infant, are unprovided with teeth, are not designed to subsist upon solid food, or at least upon that which requires mastication; and the whole analogy of nature bears us out in deciding that until the teeth are grown no solid food should be taken by the infant. The date of the appearance of the temporary teeth varies regularly with the climate, and irregularly from accidental circumstances; the latter varieties may be considered as errors of development, and in those who present them the rules of diet derived from the condition of the teeth cannot be strictly applied.

The incisors of the lower jaw generally make their appearance about the sixth or seventh month. Those of the upper jaw appear soon afterwards. They acquire about the tenth or twelfth month sufficient size to be decidedly useful, and nature certainly never designed that they should remain unemployed. The occasional employment of cow's milk, somewhat diluted and sweetened, and mixed with such farinaceous solids as are easily divided by the incisors, now becomes proper as a pre-



paration for weaning. The use of bread, mashed potatoes, and other vegetable food, should be gradually introduced.

The next teeth which make their appearance in the usual order are two of the small grinders, a kind of teeth peculiar to those animals which subsist upon vegetables, and fitted for *grinding* many of the more solid articles which the incisors can only *divide*. Some few weeks after these, the canine or eye teeth, as they are commonly called, make their appearance, and are soon followed by another pair of grinders.

The canine teeth are peculiar to animals which subsist on meats; they are designed for tearing, and their complete development marks the time when it is proper for the child to commence the use of solid animal food. In our climate, this takes place about the end of the second year; for although the canine teeth *appear* much earlier, they do not reach their full size and strength for several months.

This great change in the habits of the infant should not be made suddenly, but with considerable caution, particularly if the constitution be weak.

The use of spices, wine, and all kinds of stimulants should be rigorously interdicted until after the child has reached mature age, even by those parents who are unwilling to practise the precepts given in the earlier part of this chapter. The cruel and abominable practice of inundating the delicate and highly susceptible stomachs of infants with such stimulants as wine, whisky, and beer—a practice far more common among the poor, and in agricultural districts, than would be generally credited,—should be suppressed by penal enactments. When followed in ignorance, it is a mark of *stupidity*,—when resorted to by the intelligent, it proves the utter want of principle. I will not abuse the ear of good sense in proof of the justness of these violent expressions!

There are two errors of diet almost universal among children, which demand notice in this place. First; the abuse of cakes and doughy articles; and secondly, the use of undue quantities of drink.

Cakes which crackle under the teeth, and which, therefore, admit of complete mastication, if made of good materials, and not over-burdened with sugar, molasses, or injurious chemical substances, may be used in moderation with propriety. But how is it to be expected that the stomach can tolerate with impunity the constant stuffing of pasty masses of soft ginger or queen-cake, pie-crust, and buckwheat dough with which mothers, grand-mothers, and aunts continually oppress their little favourites, until they are weighed down by their false kindness? These substances—often rendered absolutely poi-

sonous by the employment of bad flour and chemical *correctives*—act in the same manner with coagula of milk and blood, and it is unnecessary to dilate upon the consequences; they have been already pointed out under the head of *weaning*. The robust, who use much exercise, may not suffer obviously from such diet, but it is not only injurious, but no doubt fatal in many cases, among those of feeble health or sedentary habits. In those who are subjected to the modern system of long sessions at school, the intellect itself seriously suffers by such habits in eating, and the blame attached to the preceptor for the deficient progress of the student, is often chargeable upon the parents who continually labour to vitiate the properties of the soil designed for cultivation.

The immoderate use of drinks (even that of plain water) to which children are very much inclined, is a serious injury to the stomach, and may be considered one of the most frequent causes of the dyspepsia which appears later in life. The evil results from the distention produced by the fluid. When a much larger quantity is taken than the wants of the system demand, a considerable portion is apt to remain for hours unabsorbed, and the constant repetition of this state of things soon destroys the tone of the stomach, and prevents it from contracting completely and firmly when empty. The blood-vessels are then relieved from the natural pressure which they should occasionally suffer; they become permanently enlarged and relaxed, and incapable of executing their functions with promptitude. In this condition of the stomach, after a hearty draft of water, the regurgitation of the fluid in the relaxed cavity may be distinctly heard on any sudden motion of the body. The evils following the habit of diet of which we have just spoken, are difficult to cure; but the best mode of treatment consists in the free use of table-salt, which powerfully constricts the stomach, and is not unfrequently very serviceable in the simplest forms of dyspepsia.

In childhood, food is required more frequently than in later life; and the attempt to confine a boy of less than eight years, rigorously to three meals a day, is exceedingly injurious. Children should eat often and a little at a time; nor should they ever commence the labours or amusements of the day without taking something, even though it be but a biscuit or a crust of bread.

On the subject of exercise, sleep, and clothing in children, we need not enlarge, for the principles which should govern in these matters have been already stated. But we cannot too strongly condemn the employment of a few popular adages, the practical application of which goes far to render the commencement of life miserable, to thwart the ends of existence,

and in some instances to vitiate the moral tone. Parents may smile, but

“These little things are great to *little men*.”

“*Hold up your head and look like a gentleman.*” How often are poor little creatures condemned to suffer through long hours of restraint, in the *vain endeavour* to cheat the world by seeming what the Creator never designed them to be,—arresting the development of their muscles and laying the foundation for debility and disease! The phrase should unquestionably read,—*Toss up your heels and behave like a child!*

“*Little children were made to be seen, and not heard!*” What *thinking* individual is ignorant that childhood is the season for the acquisition of facts, which, to be valuable, must be explained by their seniors, and that the reception of false impressions then, is ruinous to the good government of after-life? What an admirable opportunity for the formation of a correct moral code, is enjoyed by the child of six or seven years, when seated by the fireside or in a corner of the room, during a political discussion over the dining-table,—compelled to sit still and *reflect* without inquiry, while the conversation is rendered *perfectly free* by the assertion of the host,—“Oh! never mind him! He’s too young to understand!” Reason declares that “*Little children were made to be noisy and ask questions,*” and religion demands that they should be gratified!

#### ERRORS OF FEMALE SCHOOL DISCIPLINE.

Great evils result to the fairer portion of creation from certain infringements upon the laws of Hygiene during the later periods of adolescence,—infringements unfortunately most frequent among those who most strongly insist upon what they consider to be the refinement of female education. These errors are observed too often in the domestic circle, but as they occur much more generally in schools, we have preferred to mention them under this caption.

So much has been already said of the causes of deformity from inactivity of the muscles of the back, that it is unnecessary to allude any farther to the ill effects of corseting, particularly before the full development of the figure; but it is proper to mention that unless the use of seats with comfortable backs be substituted for the present absurd benches employed in schools, a loose corset may prove of great service in preventing the exhaustion resulting from continued exer-

tion in the vain attempt to preserve an upright attitude for hours together, by furnishing an occasional support to the person when it yields to the necessity of rest; but a tight corset is ruinous, because, by giving a permanent mechanical support, it destroys all chance of the necessary occasional exercise. Certainly it is desirable that the attitudes of students should be as easy as possible while the mind is closely engaged, and common chairs in *confusion* would be infinitely better calculated for school service than the stiff, *orderly* benches now in general use. But it seems to be adopted as an axiom in our system of education, that physical uncomforatableness is a strong incitive to the mental efforts of children! The parents of Lady Jane Grey pinched her and twisted her ears while studying, to fit her for a throne! The system brought the lovely sufferer to a scaffold! Just so, we have seen the modern student tormented, to fit him for distinction by means, which, in the strife and struggle of after life, have landed him in an alms-house!

The long sessions now so general in schools, ought to be decidedly condemned; and in cities, where ample play-grounds cannot be provided for females, a separate room for the ruder amusements should always be provided within the building. No session should be extended beyond one hour and a half, without an interlude of half an hour; and in exercises on that most trying of seats—the *music stool*—the lessons should be much shorter, and the intervals much longer. Calisthenic exercises (female gymnastics) should be universally encouraged, and among the most important of the games tending to correct the vices of form and habit resulting from school discipline, we would expressly recommend *battledore*, and jumping the rope. For farther practical hints on this subject, see the article spine in the second part of this work.

The next subject of importance, which claims our attention, is the necessary protection against cold and exposure to damp in school girls who are approaching the most critical period of adolescence. The regulations of seminaries are made for the government of the many, and, like all human laws, must press unequally upon the few, for laws cannot be rendered perfect. The dress of boarding-schools, though somewhat more rational than that observed in general society, is still so badly regulated in the case of young girls, as to be productive of incalculable evil; and, were the task not absolutely hopeless, we should feel inclined to decry the use of thin shoes and stockings; but there are other still more important exposures which must not be passed unnoticed. The fatal opinion that children are hardened by exposure, is very popular among the principals of female schools, who, being generally men,



and therefore ignorant of the peculiar precautions necessary for the protection of those of the other sex, neglect such matters in the construction of rules of government. Their literary assistants are commonly unmarried females, often not much advanced in age; and it is not to be expected—both on this ground, and, also, because the relative position imposes restraint, or endangers the destruction of discipline—that these teachers can be confided in by the pupils, as their confidential advisers on subjects of peculiar delicacy.

The housekeeper is, too frequently, either the wife of the principal or some one chosen from the ruder walks of life, and unacquainted with, or forgetful of the wants of the refined, the delicate, or the young. If the wife—her near connexion with the head of the establishment causes it to be frequently esteemed dangerous to trust her, lest punishment or loss of confidence should follow the acknowledgment of trifling indiscretions; and thus distrust and concealment too generally become habitual among the students. If, on the contrary, a housekeeper be a woman of little education or moderate intellect, she can neither win upon nor understand the feelings of those who are of a more refined class than herself, nor can she become the adviser of those who commonly exceed her in knowledge, and not unfrequently in *experience* also, if we apply that much abused word to *observation coupled with reflection*. There is, then, a necessity for some one, in every well conducted female boarding-school, who should stand in the relation of a mother and intelligent nurse to the children, not only in sickness, but in health. She should be the intimate of their hours of amusement; she should be freed from the duty of ever imposing tasks upon them. Her control should be absolute over the wardrobe and the toilet; and her authority paramount to the established regulations of the school on all exceptionable cases of diet and regimen. Her veto should even annul the edicts of the master in cases where she thinks rewards or punishments incompatible with health; but she should have no power, herself, to punish or reward, or her feelings would inevitably overthrow her usefulness.

To such a character, and to parents in general, we would suggest the following hints.

A girl approaching to her period of full development, or one who has passed that period, should never be permitted to expose herself to cold at critical times. We will name but two of the applications of this rule, the neglect of each of which has proved the ruin of the health of many, and the death of some lovely beings under our own immediate cognizance. It is customary, at most boarding-schools, for the children indiscriminately to wash in the morning in open sheds, or in

bleak pump-houses, which are intensely cold in winter, and perpetually damp and chilled by evaporation in summer. There are particular moments when this exposure is extremely dangerous to females, and it is exceedingly improper to intrust the observance of the requisite caution on these occasions to the judgment of children or the foresight of young or ignorant assistants. Moreover, there are, in every school, some individuals of delicate constitution to whom such exposures are, *at all times*, highly injurious.

Humanity requires that the rigid rules necessary for general government should give way under such circumstances, and the occasional appearance of partiality in yielding peculiar privileges to the few, is no valid plea for avoiding the proper arrangement at the expense of personal cruelty.

Among the modes of punishment not unfrequently adopted at schools, is confinement to a seat in a cold room or gallery during a stated time, in the intervals between the sessions. Whether this outrageous abuse of power is ever practised in seminaries for females we know not; but having suffered severely ourselves, and having witnessed much suffering, and one death from this punishment in a boarding-school for boys,—of high character, and governed by men undoubtedly conscientious and *esteemed* intelligent,—we deem a caution on this subject necessary, not knowing to what extent the indefensible custom may prevail.

Another more popular mode of domestic or scholastic punishment consists in confining the offender in a room, either depriving her of a meal, or restricting her to bread and water, according to the supposed enormity of the offence committed. Solitary reflection and compulsory idleness are the worst of afflictions upon a child, consistent with physical health, and, rightly managed, furnish the best means of taming the ungoverned will—but the irregularity of meals, and the deprivation of nutritious diet, rapidly destroys the tone of the stomach at any age, and are by far most injurious in childhood. The consequences are the more to be dreaded, because they seldom attract attention until the cause is forgotten.

The absurdities practised in seminaries, with regard to diet, are so numerous that we cannot pretend even to attempt a catalogue of them, but it is hoped that the remarks contained in a previous section will attract attention to the subject, and lead to the removal of much of the evil, the existence of which can only be attributed to the want of any attempt to regulate such matters by the plain laws of common sense. We cannot avoid, however, a notice of two ludicrous cases in point drawn from the vivid recollections of boyhood.

Suddenly removed from a course of sedentary study in a capital city, with a constitution somewhat enfeebled by the want of powerful exercise, free air, and sunshine; but robust and rather remarkable for muscular development among city children,—we were placed, at the age of ten years, within the halls of one of the most carefully regulated boarding-schools in the country. Our appetite was keen, for we had ridden many miles—our dinner was plain, but good—and we did tolerable justice to the soup and meat, but for the dessert, we received, like all our companions, *great and small, older or younger*, an enormous segment of a most enormous pie! *say six inches for the cord of the arc, and ten or twelve for the radius, geometrically speaking.* Our lusty associates caused their several portions to disappear with alarming rapidity,—and by the time we had nibbled off some six inches of the acute angled extremity of our own—the meal was ended!!—We rose to depart, but one of the scholars whose turn it was to act as a kind of steward to our form, arrested us with the information that it was held a breach of decorum to leave any thing remaining on the plate; and that it was therefore necessary that the pie should be demolished! Horror-struck, we exclaimed that the feat was utterly impossible, and an appeal was made to the preceptor at the head of the table. But the law was imperative; and after a few tears and some no very agreeable thoughts of home, we made our charge most manfully. Again, and again, the absolute nausea of repletion checked our progress; but there stood the vicegerent, (the patience of the teacher being exhausted,) whose only answer to all expostulation was “You must eat it!—Master Amos says so!” Never shall we forget the sufferings of that terrible dinner! But there *is an end* to all things. After three hours of strenuous exertion the monstrous load disappeared, the latter portions literally moistened with our tears. Fortunately, the pastry was vilely simple in composition, or we had not lived to tell the agonies of home-sickness and heart-broken misery endured, when, after losing an entire afternoon session in the school-room, we escaped from the dining-room to the play-grounds and seated ourselves, with aching masticatory apparatus, and unbuttoned jacket to witness the gambols in which we could not share! Supper we could not dream of—though, as it was a rule of the school that all who were not on the sick-list should be present at the table, and though this rule was authoritatively announced by the preceptor, our bitter tears, and the plea of our recent arrival at last obtained for us a dispensation. Next morning we made a confidant of an older scholar, and consulted him as to the means of evading

such horrible inflictions in future. "Nothing easier," he replied, "when you've got more than you want, slyly pocket it, and when you come up, throw it away!"

By the aid of this innocent manœuvre, we were enabled to get along in tolerable comfort, until *the gradual distention of our stomach*, and the vigour produced by romping games in the free air of the country, enabled us to dismiss one of those fearful pieces of pie with great satisfaction; but at that school was laid the foundation of a *dyspepsia* from which we are never likely to recover!

Another scene at the same school resulted from the attempt of the teachers to compel an unfortunate youth to partake of the usual nightly fare of mush and milk. He had a peculiar idiosyncrasy which made it impossible to retain the article upon his stomach. His *finesse* in concealing his absence from the supper-table, or in getting his neighbours to relieve him of the disagreeable duty of eating that which he loathed, at length failed in protecting him. The laws prescribed not only presence at the table, but active co-operation in the demolition of *mush and milk*! Compulsory process was issued, and the unfortunate lad was placed under guard, and allowed nothing at his subsequent meals but the identical bowl of this homely material at first refused, until cured of his contumacy, which was attributed, in spite of his asseverations to the contrary, to a fondness for luxury or a contempt for the table. Breakfast and dinner passed untasted; but the prisoner had many friends: when supper appeared, and the word of attack was given, the teachers were astonished at the universal silence which pervaded the dining-hall.

The children had made common cause with the sufferer, and philosophically refused to eat their meal, unless he was supplied with more palatable food. The dignity of the teachers was compromised and the whole school, with one exception, went supperless to bed. The hard law which bore upon the obstinate individual was not relaxed, and all the rebellious were condemned to be deprived of their occasional luxuries until they returned to obedience, and mush and milk! On the next evening only six generous fellows, undauntedly lost their suppers in defence of principle; and these were locked up in a room employed as a species of prison for delinquents, with their porringers before them *to yield or die*. Three days passed by, yet still the urchins looked as hale and vigorous as ever,—the untouched mush and milk had grown dry and mouldy! The teachers found themselves in a ridiculous position, and were compelled to yield to necessity by permitting the cause of all this turmoil his free choice between *mush and milk*, and a supperless night! Long, anxiously, and in



vain did the preceptors seek the cause of these camelion-like powers of their pupils! Twenty-four years have passed since we figured in these scenes, and will now venture to hint that they were supported by the ingenious *petty larceny* of their fellow pupils. The *modus operandi* we forbear to mention, in charity to future victims of oppression.

One of the ornaments of the profession will smile to see this little story, in which he was the principal actor; but he will coincide with me in the opinion that the dietetic system of this extremely well regulated school was not very philosophically adapted either to the physical comfort or moral well-being of the pupils.

We will here close our remarks upon school discipline, in the hope that our hints may lead not only preceptors but parents to reflect upon the real importance of many little details relating to education which it is impossible to notice in this work.

#### OF MATRIMONY.

We come now to a very important subject, upon which our previous remarks on physiology and hygiene should have a practical bearing, and it is intended to devote a few pages to their application, to an important epoch in the career of the fairest portion of the creation, WOMAN, who has been destined to be the bosom friend of man, and the medium through which the race is to be perpetuated. We trust we shall stand excused by them from any disposition to invade their peculiar privileges, if we venture, as their philosophizing friends, to mark out the course proper for them to pursue in order to attain the great end of their existence.

Given as a *help meet for man*, it becomes woman to yield obedience to those laws which tend to the improvement of the race.

From what has been said in the preceding part of this work, it will be remembered that the development of the body is successive, that one organ after another comes into play. Thus, at the very earliest observable period, human existence is merely vegetative, without volition, sensation, or motion; as the muscles become developed motion is effected; as the nervous system is expanded sensation is experienced, and after it has reached another degree of development volition is manifest. After birth, the animal and organic life gradually acquire force, till they, in concert with the cerebral mass, become consolidated, and intellectual manifestations occur. By degrees the being expands, the strength increases, and, as a common rule in this country, at about the age of fourteen years it assumes

the capacity of reproducing the race. Still, however, this season is premature for the healthy performance of this function. Early marriages are to be deprecated, as they materially influence the health and well-being of the offspring; this is evident, not only in mankind but in inferior animals. Let all the organs of the system be kept in a healthy condition,—let them acquire firmness, with their functions unimpaired by improper use, and, under circumstances otherwise favourable, we may readily calculate upon the most happy result of a judicious marriage—a family of healthy children.

The exact period at which the body becomes fully expanded is not readily fixed, being much influenced by the original constitution, the physical and moral education, as well as the climate, habits of life, &c. While in the tropical regions, the system is as it were forced into a rapid development, and females not unfrequently become mothers at 9 or 10 years of age, in the colder regions women are not prepared for this function till at a much more advanced period. The ancient Germans, who were remarkable for their bodily and intellectual vigour, were very exemplary in their moral habits, and never married till they were 24 or 25 years old.

All other circumstances being favourable, we might, perhaps, consider that from 19 to 23 years for the female, and 23 to 28 for the male, would be the proper period for marriage in this country.

It is the result of observation, that women, entering upon the arena of matrimonial duty at the age of 21 or 22 years, may become mothers of as large a family in the course of the next fifteen years as those who assume this position at the earlier age of 14, 15 or 19 years, provided both are placed under equally favourable circumstances, while the former will probably find themselves less exhausted by the change, and enjoy all the pleasure of being surrounded by a more vigorous offspring.

In large cities where free air and sufficient muscular exercise are not easily obtained, precocious marriages are productive of much evil, causing not only diminished vigour, and short life in the father, blighted health and tarnished beauty, as well as premature decline of life, in the mother, but also debility of body, predisposition to diseases, such as scrofula, rickets, and consumption, together with imbecility of mind, or even fatuity of intellect in the children. In healthy districts of open country, where the calm pursuits of agricultural life do not much interfere with the dictates of nature, less inconvenience will probably result from a slight anticipation of the time we have intimated as commonly the best for effecting the new relation. In newly settled countries marriage contracts are often determined by the ability of the husband

to purchase a small tract of land, in the labour of clearing which his young wife will often aid, till called therefrom by the imperious duty of fostering her offspring, which in the course of a very few years often become numerous, and generally attain to great vigour of body and mind.

Those who, in order to escape the fatiguing duties of a matrimonial life, and continual anxiety from the care of young children, resolve not to wed themselves to such a charge, and thus aspire to sail lightly along the tide of life, should remember that while they fail to fulfil one of the objects of their existence they are in general more short-lived than those who, having rightly cultivated and exercised their organic functions, are sometimes remarkable for their longevity. Hufeland tells us that all those who have attained to a great age were married even more than once, and generally at a late period of life; and that there is no instance of a bachelor attaining a great age. There are some striking instances of advanced life where marriage was often repeated. Thomas Parr, of England, who lived 152 years, was married several times; De Longville, of France, lived 110 years and married 10 wives; the writer has seen Andrew Wallace, a Scotchman by birth, though actively engaged in the revolution of this country, which he had adopted as his own, moving with pretty firm step, in the streets of Philadelphia at the age of 106. We believe he had been married several times.

Not only is it important in our estimation that the persons who become candidates for marriage should have attained a full development of their organs, but, in order to the happiest result, both parties should be possessed of health and a good constitution; for it is possible that the organs may be brought up to their full development without their having acquired that firmness and stability which cannot be easily deranged by the changes which occur in the progress of the function of reproduction. It is true that we occasionally meet with children apparently very robust, though born of feeble parents: these exceptions, if properly watched, will be found to fall within the rule; for sooner or later we witness in most of them the premature decay of the rosy cheeks, marasmus, phthisis, or other manifestations of a scrofulous diathesis. If these children should attain to manhood, and in their turn become parents, what is to be expected other than a rapid degeneration of the race?

It is well known that the diseases of parents are often visited upon the children or the children's children through several succeeding or alternate generations, and unless great care is exercised in their moral or physical culture, whole families decline from the bodily and mental vigour for which they

were once remarkable, until they either sink into obscurity or become pests to society. This observation will apply to the intellectual as well as the physical condition, and as a vicious predisposition in either may be developed in after life, though the early years may have been passed in apparent good health both bodily and mental, parents are bound to investigate the morbid hereditary tendencies of their offspring before they encourage their intermarriage with those who display similar tendencies. We may, perhaps, be permitted, owing to the importance of this subject, to introduce the strong language of Dr. Reid on this matter. "Nothing can be more obvious, than that one who is aware of a decided bias in his own person towards mental derangement, should shun the chance of extending and of perpetuating without any assignable limit the ravages of so dreadful a calamity. No rites, however holy, can, under such circumstances, consecrate the conjugal union. In a case like this, marriage itself is a transgression of morality. A man who is so situated, in incurring the risk of becoming a parent, involves himself in a crime which may not improbably project its lengthened shadow,—a shadow, too, which widens in proportion as it advances,—over the intellect and the happiness of an indefinite succession of beings." It becomes our duty, then, to comply with the duty of averting or mitigating these evils by judicious and well selected marriages, and a properly directed physical education. In this way we may do much in arresting the transmission of hereditary bias; and by invigorating the general system we render it less susceptible to exciting causes, and strengthen those parts which may be liable to diseased action. Experience has taught the necessity, in some of the old countries, of avoiding these evils as far as possible, and it is said, particularly in Europe, that in the higher ranks of society, before the marriage contract is signed, inquiry is frequently made whether either of the parties are liable to any disease by hereditary descent, the gout, however, appears to be excepted; this being a disease to which the royal family is incident, or being an evidence of the good living of the family, may possibly be considered a *mark of distinction instead of an evil!* Marriages have been frequently broken off, even at a late period, when it was discovered on the side of either party, that scrofula, consumption, or madness had existed, or was actually existing in any member of the family.

The efforts which have been made within a few years past to destroy the vice of intoxication, so common in this country, have been already commented upon in the early pages of this chapter. This practice, as well as general dissipation, should be strongly deprecated by females, who should never



unite themselves to a man addicted to either of these habits; and we agree with a late luminous writer on this matter, that they should be protected by legal divorce if the husband should acquire the former habit after marriage. Constant or frequent excitation by intoxicating drinks impairs the intellect; general dissipation acts most powerfully in enervating the strength of the body; and not only does the woman suffer all the horrors which attend such indulgences in her husband, but *her offspring* too frequently inherit feeble constitutions.

There is no other form in which the curse falls either so commonly or so terribly upon the evil-doer, as when his crimes impair the moral or physical sanity of his children. It seems cruel to deny to the repentant the solace of domestic enjoyment,—often the only means of restoring them permanently to society and usefulness,—to present and eternal welfare; but we owe it to our readers, as a duty, to state that it is not by example alone that the son of a drunkard is so often led to resort to intoxicating drinks, and that the child of the libertine flies to the haunts of vice, or dies prematurely in his innocence from the results of bodily disease inherited with his paternity! Inherited, did I say? Too often the victim falls before the parent, who, perhaps, has long forgotten the sufferings entailed upon himself by “*youthful indiscretions*,” and dreams not that he winged the arrow that leaves him desolate! *Habits, like diseases, are often hereditary!* The stronger sex pursue, with unrelenting cruelty, the slightest errors of the weaker. By what right, then, can the man of the world attempt to oppose us when, permitting stern justice to take her course, we utter a solemn caution to those fair beings whose rights are so feebly protected, even in the most civilized societies! He may be amiable and good-hearted, in the common opinion of mankind. Even after trampling upon the crushed hearts of others whose weakness claimed his protection, he may be held *magnanimous* and noble. Perfect may he be as Crichton, and beautiful even as Antinous.

Yet beware! If you would not resemble the pale statue of immortal Grief in her vain strife to shield the last sad relic of her lovely ones—the childless mother circled by her dead! Then shun that most mistaken thought, so often uttered by the fondest of *your* sex and the *worst* of ours, “The reformed *rake* is the best of husbands.”

While we have thus furnished to the female some points of importance to her in placing herself in a position to perform the part she is to act in life, we must not pass over, without proper notice, the qualifications necessary for *her* to possess, before she should enter upon this interesting and important sphere of duty. In proportion to the value she sets upon her own

health, and the gratification she would feel in finding herself, at a proper period of life, surrounded by a group of healthy children whose physical and mental powers she would be the happy agent in expanding, let her not pass over lightly, or conceal any physical disability which might make marriage fatal to herself, or give evidence that by such concealment she had been dishonest to the man who entered into this relation with her. The existence of cancerous affections, or a known predisposition to them, should always be considered by her an objection to matrimony. There are also certain physical conditions of her system which render her liable to more than ordinary suffering from parturition, if this process take place for the first time at a late period of life: and a woman becoming a mother at this time will also be liable to be deprived of the pleasure of seeing her children settled in life before she is herself obliged to leave the world, even by the common contingencies of age. We would therefore suggest, that those who have deferred this ceremony till beyond the thirty-fifth year, had better wait till they have passed the period of becoming mothers.

We will now close this subject, and with it the chapter on Hygiene, with a single remark upon the means by which hereditary tendencies may be eradicated, or rendered weaker in families, by judicious intermarriages.

It is well known that, as a general rule, the offspring partakes of the peculiarities of both the parents. Now hereditary diseases are, for the most part, the result of either a deficient or an undue development of some particular organ or system; and by marriage with one whose natural tendencies are the reverse of our own, we may neutralize the diseased disposition of both parents in the constitution of the offspring. Thus, a female of lymphatic temperament, who is obviously predisposed to cancerous affections, may intermarry with a man whose circulatory apparatus is unduly developed, and who is threatened with hemorrhagic or apoplectic disease. In this case the probability of the occurrence of cancer or hemorrhage among the descendants would be much less considerable than if the parties had formed a connexion among those more closely resembling themselves respectively. Another instance of the same kind of compensation is observed when a powerful and athletic individual, whose mind is perhaps less vigorous than his person, intermarries with a scrofulous or consumptive female, whose talents are precocious and whose genius preys upon the corporeal energies. Unfortunately, this mode of correcting idiosyncracies is not entirely effective; for once in a few generations, some individual of the race, impressed with the peculiarities of his progenitor, almost

always appears, and sinks a victim to the demon who haunted the parents! Yet, sufficient good results from the consideration of physiological principles in matrimonial arrangements, to render the advice of a medical philosopher highly important on many occasions.

In our land, where the free play of the heart is more generally consulted in love affairs than in any other, it may seem almost hopeless to lay down any rules on such a subject; and far be it from us to desire to roughen the "way of true love" by any unnecessary checks! Nature, were not her dictates thwarted by the errors of false education and by ridiculous conventional arrangements, would regulate these matters even better than the doctor,—for it is a singular fact that attachments of a serious character are much more frequently formed between dissimilar individuals, than between those who strongly resemble each other; the strange likeness so often observed between husband and wife, when they have been long married, being an acquired one from similarity of pursuits and position, and not an original one from primitive conformation:—it is physiognomical, from community of feeling,—not structural, from constitutional identity.

But even with us the progress of luxury, refinement, folly, and vice, is rapidly introducing customs at variance with nature. Matrimony has become, and will continue a matter of over-legislation—and our hints may be useful to those who do not consider BEAUTY as paramount to DUTY, and WEALTH more estimable than HEALTH.

**PART II.**

---

**PRACTICAL DIRECTIONS**

**FOR**

**THE TREATMENT**

**OF**

**MEDICAL AND SURGICAL CASES.**





## PART II.

---

### CHAPTER I.

#### OF SURGICAL ACCIDENTS AND DISEASES.

IN the present chapter it is proposed to speak of the mode of treating accidents and external diseases, so far as they can be safely managed, when the advice of medical men is not attainable.

It has been customary, in most popular treatises on medicine, to arrange the subjects alphabetically for convenience in reference, but the author deems it more proper to preserve more strictly the mutual connexions between the various affections which fall under the notice of the practitioner, because facts are always better understood and retained more readily in the memory, when viewed in their relation to other facts which are similar in character, causes, and results. The subject of this chapter will therefore be divided into numerous sections, commencing with those injuries which are purely accidental, then treating of local inflammations and their consequences, and concluding with some of those affections commonly ranked with surgical diseases, and usually termed constitutional and specific.

#### SECTION I.

##### OF WOUNDS AND CONTUSIONS.

A contusion or bruise is but an internal wound, or a wound which does not communicate with the external air, for al-

though some bruises are not apparently attended with the tearing or separating of the flesh or other soft parts, the effusion of blood from the vessels, which occasions the black and blue colour of such parts, proves that many of the capillaries at least, are really torn—for this reason we class these two kinds of accidents together.

OF INCISED WOUNDS, or such as are made with a sharp cutting instrument.

Wounds of this class are always attended with rapid bleeding, and if the quantity of flowing blood be considerable, this discharge demands immediate attention. The dark red colour of the venous blood is generally very easily distinguished from the bright scarlet of that which springs from an artery. The former always flows in a steady stream, while the latter is thrown out by fits and starts; each jet of which, when large vessels are divided, often flies many feet from the wound and corresponds with one bound of the pulse. When the arteries are very small, this jerking motion of the blood is scarcely perceptible, but in such cases there is rarely much occasion to determine the character of the vessel. Bleeding from the veins is seldom attended with great danger, and is easily stopped by pressure on the orifice of the vessel or near the side of the wound. The bleeding from veins almost always appears chiefly on the side of the wound farthest from the heart, but that from arteries, except in wounds about the joints, usually springs from the side next the heart.

*Modes of stopping the Bleeding.* If the discharge of blood be small in quantity, it generally stops, in a little time, without the assistance of the surgeon; but in all cases, except in wounds from glass or china, it is right to check it by pressing the edges of the wound firmly together and keeping them so by proper dressings. If the wound be on the forearm, hand, leg or foot, the bleeding is much retarded by placing the limb in the most elevated position, (that is, above the body,) and supporting it there. If the wound cannot be closed, it is often proper to fill it with lint, which, by coagulating the blood, prevents its further escape; and if this fail, some lint may be dipped in a strong solution of alum, and then stuffed into the wound; but this mode of treatment is altogether inadmissible, unless the injury be of such a character that the wound cannot be or ought not to be healed immediately. There are many more powerful remedies for these slight hemorrhages, of which the most formidable is the actual cautery, or burning with a hot iron; but the attempt to use these without competent surgical advice would be extremely improper and dangerous.

When the amount of bleeding is more considerable it is often necessary to take up the arteries, and if their mouths

are distinctly seen on separating the edges of the wound, they may be safely seized by a pair of small pincers or a delicate hook, and tied lightly with a ligature composed of two or three strands of waxed sewing silk, slightly twisted. The arteries in such cases are recognised by the jet of blood that shoots from them at every pulsation, and care must be taken to confine the noose of the ligature as closely as possible to the artery alone, for fear of including some of the little branches of the nerves which are often found close in the neighbourhood of these vessels. This little operation can rarely be attempted by those who have no surgical education, but it may be useful, under certain circumstances, for all to be acquainted with it.

If the wound be located on either of the extremities,—until proper medical assistance can be obtained, it is easy to command the hemorrhage by means of a tourniquet, an instrument which will be presently described.

If a very large artery be wounded, such as the principal blood vessels of the neck, the arm, or the thigh, it is almost impossible for any one unacquainted with surgery to retard, even for a moment, the fate of the patient, unless the tourniquet can be employed. The bleeding, in such cases, is tremendous, and threatens rapid dissolution.

*The Tourniquet* is an instrument intended to apply and tighten a ligature about a limb, near to the body, in such a manner as to compress all the blood vessels of the limb so as to arrest completely any hemorrhage which may occur in any part of it. This is the instrument employed by operators, to prevent bleeding while they amputate a limb. It cannot be employed for many hours together without destroying the vitality of the member, and is, therefore, only a temporary remedy. It must be placed, in all cases, between the wound and the limb—and should always be applied on some part of the limb which contains but one bone, for in the leg or forearm the vessels between the bones would continue the circulation in spite of the tourniquet. Thus, in wounds of the hand or forearm, it is usually fixed about the middle of the arm, and in those of the leg or foot, on the middle of the thigh. The instrument as employed by surgeons, is too costly to be found in families, but the field tourniquet, which is a simple strap with a peculiar pad and buckle, might be used with propriety on large plantations: it is designed for military surgery, and is sold by all the instrument makers. The best substitute for sudden emergencies is the following. Tie a silk handkerchief, folded diagonally, till it is about two inches wide, loosely round the limb where the tourniquet is required, so that the knot, which must be very secure, may bear as nearly as possible over the route of the principal artery of the limb which



is a little in front of the middle of the inner side of the thigh or arm. Now take a short stick, (six inches of the end of a brush-handle will answer the purpose,) and thrusting it under the handkerchief, on the outside of the limb, twist it till the bleeding stops. If time permit, it is best to place a flat compress of linen or muslin beneath the stick, to keep the handkerchief from pinching the skin; and if the operator knows exactly the route of the artery, it is also advisable to place a small roll of muslin beneath the knot. By a general knowledge of this mode of treatment, the life of many a patient may be saved until surgical aid can be procured from a distance of twenty miles. No matter how severe the wound may be, if the bleeding threatens the life of the patient, the tourniquet should be instantly applied by the most intelligent by-stander who possesses sufficient nerve for the purpose.

*Wounds beyond the reach of the Tourniquet.* When wounds of large arteries take place so high on the thigh or arm that there is no room for a tourniquet between the wound and the hip or shoulder, death generally takes place very rapidly, unless aid be afforded by an intelligent and prompt assistant. The finger placed on the groin near its inner side, feels a strong pulse beating just where the main artery of the limb passes over the edge of the pubic bone, (*see anatomy of the pelvis,*) and just at this spot, the end of the thumb pressed strongly on the bone cuts off the greater part of the circulation by closing the artery, and very much lessens, if it does not entirely check the hemorrhage. The great artery of the arm winds round and over the first rib, behind the clavicle or collar bone, (*see skeleton,*) and by pressing the thumb strongly down behind the latter, its pulse may be felt. Pressure in this place stops a bleeding from the large arteries of the shoulder or arm-pit, but it is an extremely painful measure.

By such means as have been just described, the life of a patient may be preserved for half an hour while a surgeon is called, and the instruments prepared for a serious operation. But the position of the artery in these two situations should be ascertained *before the accident*, by those who wish to be prepared for usefulness on momentous occasions. When the wound is bleeding, it is generally too late for the novice to attempt a successful exploration. The uninitiated operator must husband his strength and suppress his feelings! This kind of pressure cannot be long preserved without extreme exhaustion. We have several times had valuable lives suspended upon the last joint of our thumb, *and we never perspired more freely!*

In wounds in which large arteries are divided on one side

of the neck, *and only on one side*, life may be preserved for a few minutes, provided there is room enough for pressure with the thumb between the clavicle and the lower edge of the wound. The carotid artery may be stopped by pressing the thumb backwards between the outside of the wind-pipe and the front edge of that large muscle which winds round the side of the neck from the breast-bone to the long projection immediately behind the ear. Along this space the pulse of the artery is very plainly felt. When large arteries on both sides of the neck are wounded, no one but an accomplished surgeon can be of any use, and even he can rarely save the patient; for stopping both carotids at the same time would in itself occasion death, by nearly cutting off the circulation in the brain: the two small cervical arteries, which alone could carry blood to the interior of the head under such circumstances, are, in all probability, unable to maintain the functions of so large and important an organ even for an hour. When one carotid, or its principal branches are cut, life cannot be preserved many minutes without a surgical operation, for the connexions between the vessels on the two sides of the neck are so frequent and so large, that the patient soon dies from the loss of the blood flowing through the branches of the uninjured carotid.

In wounds of the body which do not penetrate the cavities, it is generally impossible to stop the bleeding from large arteries by any other means than by tying the arteries, or by stuffing the wound with lint and placing a firm bandage over the compress. When the last method succeeds, it is very improper to remove the lint or dress the wound, without advice, in less than forty-eight hours. Even then, if the lint adheres firmly, or the wound is covered with a coagulum of blood, it is wrong to disturb it, until nature herself loosens it. Lint should never be used in cuts unless under necessity, for it destroys the chance of healing the wound immediately. In all incised wounds, heat or ablutions with warm water promote bleeding, while cold tends to lessen it.

He who studies the foregoing directions will be prepared to render all the assistance in checking hemorrhage from incised wounds which can be safely undertaken by those who are not of the profession.

*Mode by which Nature effects the cure of incised Wounds.* There are two modes by which nature heals incised wounds. The first of these is called *healing by the first intention*, and can only take place when the sides of the wound can be kept nearly or quite in contact, and when the bleeding can be stopped without much handling.

Soon after the wound is made, the blood vessels around the

cut throw out a kind of glutinous secretion, which adheres to both surfaces of the incision; and when the edges are kept close, rapidly grows harder and more adhesive, filling all the little intervals of the wound, and binding the sides together. In twenty-four, or forty-eight hours, this secretion becomes pretty solid, and new communications are formed in it, between the blood vessels on the opposite surfaces. A few days, or weeks, according to the extent of the injury, render the new-formed bond as firm or firmer than the original structure. Such is the simple manner in which wounds unite when no large arteries are wounded, when no unnecessary washing or handling is resorted to, when the parts are kept together and at rest, and when no nostrums or stimulating applications are applied "to hasten the healing."

A little coagulated blood between the lips of a wound will not prevent this kind of union, if the orifice be well protected from the air, and the lips pretty strongly pressed against it, for it is generally absorbed before the glutinous fluid loses its character. Even larger coagula are often left under deep flaps in some incised wounds, where they are beyond reach, and the parts healing rapidly over them, they may give no trouble. If there should be a small cavity at the bottom of a large wound where the sides cannot be kept in contact, (as when a muscle is divided and its fibres retract,) it is better that it should continue to be filled with blood than with any thing else, as this fluid is less irritating than any other. But it is an important general rule that the bleeding should be stopped and all coagula removed before attempting the first dressing of an incised wound, as the neglect of this rule very often occasions an abscess or an ulcer; for blood, when long in contact with the air, becomes highly irritating, and in many persons it is difficult for the absorbents to remove a large coagulum, even when a wound has healed over it.

If the edges of an incised wound cannot be brought quite together, if the bleeding vessels require time in taking them up or stopping them, if balsams or other stimulating applications are applied, as is often foolishly done under the idea that these nostrums are "good for fresh cuts," or, lastly, if the bad state of the constitution bring on inflammation in the wound, —then the union by the first intention will often fail to be accomplished, and the injury must recover by what is called *union by the second intention*. Still it is of great importance, except when the wound is inflamed, to keep it as nearly closed as possible by the dressings, in order that the cure may be as rapid as possible, and that some part of the cut may unite immediately, so as to diminish the labour of nature.

*In union by the second intention.* The vessels pour out

the same glutinous fluid that has just been mentioned; but this, instead of binding the sides of the wound together, appears to become converted into a kind of new membrane, covering the whole surface, and soon taking on the characters and functions of a living organ. In a few hours this membrane itself begins to form a new secretion, differing in character from any thing seen in the sound and healthy body. This secretion is called *pus*, or more commonly *matter*, and is too well known to need any description. Beneath this fine and perfectly transparent membrane, the capillaries enlarge themselves, and, perhaps, increase in number until the surface, when washed or cleansed, appears as red as if it were composed entirely of translucent blood vessels. These capillaries not only supply the new membrane with the fluid necessary to furnish the pus which bathes the wound, but they also deposite a kind of glutinous matter in the cells of the cellular tissue all around the cut, causing it to swell up, and gradually fill the cavity of the wound with a multitude of little conical eminences called *granulations*, which look like flesh, but are really composed of cellular membrane coloured by innumerable little blood vessels. Wherever these granulations come together, whether in consequence of their own growth or the dressings of the surgeon, they soon unite, and the secretion of pus ceases in that spot. At length the constant growth of the granulations fills up the whole cavity nearly or quite to the level of the surrounding surface, and then the new membrane gradually dries and takes on a character somewhat like that of the skin, the change commencing at the edges, and tending toward the centre. This is called the *cicatrization of the wound*.

After the cicatrization of the wound, the absorbents soon take up the glutinous matter secreted in the cellular tissue, to form the granulations; and the new scar with the parts beneath begin to contract with great force, drawing together the original sides of the divided parts. It is this strong contraction, which cannot be prevented, that produces the terrible deformity from wounds or other injuries, when large portions of skin have been entirely destroyed, as we see in burns.

Such is the history of union by the second intention in incised wounds, when the patient's constitution is healthy, and the case not tampered with by ignorant pretenders; but many trivial causes may interrupt the process. If the discharge of the pus be prevented by closing the wound too tightly, it collects within, and its pressure not only prevents the granulations from forming, but causes the cavity to enlarge like an *abscess*. If inflammation attack the part, or if the wound be left so much exposed that the air causes the pus to become sour or bad, the granulations do not fill up the cavity, but it



degenerates into an *ulcer*. In certain states of the constitution or conditions of the part, the granulations are rendered large and weak, rising up beyond the surface of the skin, and forming what is commonly called *proud flesh*: over this the wound either refuses to heal, or, if it unite at all, continues exceedingly liable to re-opening from slight injuries.

After these remarks, the reader is prepared to understand the treatment of incised wounds.

*Treatment.*—The bleeding being stopped, the next thing required is to secure the union by the first intention of the whole wound, or as large a part of it as possible. All that is required in dressing for this purpose is to close the wound and keep it closed,—and the following are the proper measures.

*The suture or stitching.* It is a very popular prejudice that large wounds generally require to be sewed up. A good surgeon very rarely uses a stitch, except in wounds of the eyelids, nose, lips, or ears, when it is impossible to use sticking plaster, or bandages so as to close the wound. It occasionally happens, however, that a cut is made many inches in length, and in an angular or very irregular direction, so that it cannot be closed throughout its whole length without a suture, and we may then place one or two stitches at the angles with advantage: but these should only be regarded as assistants to the sticking plaster or bandage, and the attempt to sew up the whole length of a wound of any ordinary dimensions, or even to close a part of it by a regular seam is justly regarded as horribly bad surgery. Each stitch must be separate, and should be taken in the following manner.

Take one, two or three threads of sewing silk (the uncoloured is best.) about six inches long, and well waxed; pass this ligature through the eye of a darning needle, if no curved surgeon's needle be at hand—giving preference to the common Dutch needle, if possible, for these are much less likely to break than those made of steel. Pass the needle through the skin, from one side of the wound, directing it from within outward, so as to pierce the skin about half an inch from the cut, unless it be in a very delicate part, like the eyelid—taking care to include the whole thickness of the skin, *which varies from the eighth to the half of an inch in different places.* Having drawn the ligature through until its middle lies in the wound, detach the needle entirely, and thread it with the other end of the ligature: then beginning in the wound below the skin, bring it out in the same manner on the opposite side. The stitch is then complete, and it only remains to tie the ends of the ligature, either in a single knot, or in the sliding noose, usually called a booby's knot. The stitches should never be tied tighter than is barely sufficient to cause the edges

of the wound to touch each other gently, and all strain should be taken off by supporting the rest of the wound by strips of sticking plaster or the bandage. If the parts become swelled or inflamed, the stitches must be cut immediately, and as soon as the part adheres sufficiently to need them no longer, they should be divided and drawn out. Clumsy operators and those who have not received a regular medical education make much more use of the suture than those who are experienced. The writer of these pages, in treating some hundreds of cases, including many wounds of the eyelids, nose, lip, tongue, and ear, has never had occasion to employ a stitch, except in three instances.

*Adhesive strips*, or pieces of sticking plaster, are by far the most important means for closing incised wounds. Although their use is so well known that it is unnecessary to explain what is meant by them, there are some precautions in applying them which require notice. It is best to make them as broad as convenience will permit, provided the wound be not exceedingly short, or seated on a very irregular part. They should be not less than six or seven inches in length for large wounds of the body or extremities, and as long as possible for those of the face, hands, feet, &c. They ought never to be applied lengthwise to the wound, but should cross its course in the way best calculated to keep the sides together. We must never permit them to cover the whole wound, for it is necessary to allow short intervals between the strips in large wounds, and the ends of the cut should never be quite covered, however small it may be, in order that blood or pus, if any occur, may escape without parting the sides of the wound. A strip of adhesive plaster should never be permitted to encircle the whole limb, for its pressure would then tend to embarrass the circulation by acting like a ligature and preventing the return of the blood through the veins. In wounds running lengthwise of the fingers, it is absolutely necessary to employ strips which would pass several times round the part; but the difficulty can be generally conquered by winding the strip in a spiral direction, so as to allow the capillary circulation to be continued round the intervals between the turns.

When any of the blood vessels of the wound have been tied to prevent bleeding, one end of the ligature is always cut off close to the knot, and the other must be left long enough to project from the wound, in order that the ligature may be drawn out when it has separated from the end of the vessel, an occurrence which takes place in from three days to as many weeks, according to circumstances. These ends of the ligatures must be permitted to pass freely through the intervals between

the adhesive strips, and, if possible, it is best to bring them out at one angle of the wound, preferring the lowest angle, in order that the pus which always forms along the track of the ligature may flow out most easily.

When the wound is fairly closed by the adhesive strips, a small piece of soft rag or patent lint covered with simple ointment, should be laid over the whole, taking care not to cover a great deal of the surrounding skin or the ends of any of the strips with the salve, as this loosens the sticking plaster and irritates the surface. This ointment prevents the discharges from the wound from becoming dry, and rendering the necessary removals of the dressings painful to the patient.

The first dressing should never be removed in less than forty-eight hours without strong necessity, or the commencing adhesions will be torn, and the wound re-opened. In taking off the sticking plaster, we should always begin at both ends and pull the strips by doubling them back and drawing toward the wound. If the parts be covered by long hairs they should be well shaved before applying the plaster, and if the strips in coming off adhere to the small hairs, these should be cut with a sharp knife as we proceed. All the dressings after the first should be repeated every twenty-four hours in warm weather, and at least every forty-eight hours in winter.

*Bandages.* Whenever an incised wound is situated on a moveable part—such as the neighbourhood of the joints—and whenever the cut is very deep or extensive, it is apt to gap or to be dragged open on every attempt at motion. It is then highly important not to trust the closing of the wound entirely to the adhesive strips, but we should support the part with a bandage, and confine it in a state of absolute rest. Thus a deep cut across the front of the arm would be opened at every attempt to straighten the forearm, and it is necessary to keep the arm in a sling in order to prevent this accident, and if a deep cut lengthwise of the arm shows a tendency to gap, it is proper to confine the whole arm in a spiral bandage, such as surgeons call *a roller*, in order to assist the adhesive strips by pressing the edges together.

Whenever we employ rollers on either of the extremities, it is proper to begin at the fingers or toes, where the bandage should always be tightest, and to continue it gradually up the limb until we have passed the wound and its dressings. This is done to prevent the pressure of the roller from acting like a ligature and embarrassing the circulation in the veins below it. More will be learned by seeing a roller once properly applied by an accomplished surgeon, than by many pages of description; and all that we can now offer the reader on this subject is, 1st, never to employ a bandage of more than two

and a half fingers' breadth for the arm, or three fingers' breadth for the leg; 2d, to use for all their rollers the common domestic bleached, but unglazed muslin, at from 10 to 15 cents per yard; 3rd, never to sew separate strips together to make a bandage, if this can be avoided; 4th, always to make the turns of the roller overlap well; and lastly, never to allow the bandage to be creased or rumpled where it touches the skin.

*Splints.* In all wounds running crosswise on the fingers or in certain places about the larger joints, it is always advisable and often absolutely necessary to resort to other measures than the adhesive strips and bandage in order to control the motions of the neighbouring joints, and secure the wound from being torn open inadvertently. For this purpose we employ splints, or strips of some firm substance, to extend along the limb, generally from its extremity to the joint next above the wound. These are bound on by means of a roller passed round both the limb and the splint.

There are a great many different kinds of splints employed by surgeons, but only two varieties can be employed in domestic practice with any propriety. These are the paste-board splints, and the wooden splints.

*Paste-board splints* are best made of the thickest book-binder's board, or—if great strength be required—of two of these boards strongly glued together. The splint being cut to the required length and breadth, by means of a strong jack-knife, is to be dipped into, or passed through boiling water for a few seconds only, until it will bend in any direction without breaking; but it must not be soaked so as to make it very soft. It is then placed on the limb and secured by a pretty tight roller, which causes it to assume the form of the parts on which it presses, and in a few hours it becomes permanently moulded to that form by drying.

*Wooden splints* should be made of panel white pine, cedar, or ash, the two former being preferable in most cases, because they are so readily cut by a pen knife. The wooden splints which are required in all wounds of the extremities except perhaps those of the thigh, are best made of a smooth common shingle, plained down until reduced to one half, or one third the thickness of the butt: a splint of any shape can be cut out from this with a pen-knife in a few moments, and the edges and angles being rounded off it is ready for use. Several shingles thus prepared should always be ready in case of accident, in every large establishment, and on all considerable plantations.

Before a splint is finally applied, it should always be lined with tow or cotton, and if of wood, this lining should be bound on to it by a bandage or piece of smooth muslin. We shall



speaking further on the subject of splints in mentioning the incised wound of particular parts.

*Of incised wounds by glass.* It is very important to mention that cuts made by glass form an exception to the general rule in the treatment of incised wounds. It is almost impossible to tell when we have removed the last fragments of such a transparent substance, and if the wound should heal, as it may often be made to do, over a piece of glass concealed beneath the skin, the consequences are often very troublesome, and sometimes dangerous. For this reason glass wounds should never be united by the first intention, but should be dressed for at least two days with a plain bread and milk poultice, introducing a little common lint between the edges of the wound before applying the poultice, if the cut be deep and narrow. Afterwards the wound will unite by the second intention, and the granulations, as they rise, will thrust out any portions of glass remaining in the cavity.

If we fail in causing the union of the whole of an incised wound by the first intention, we can almost always succeed with the greater part of it; and very little variation in the treatment is commonly required to effect the union of the remainder by the second intention. The same care continues to be necessary in keeping the wound closed as accurately as is convenient by adhesive strips, bandages, or splints. Stitches are generally cut away, when incised wounds begin to throw out pus, or *suppurate*; but this should not be done if removing the stitch will put the parts upon the stretch, or cause the wound to gap very much. Greater care is now required to avoid allowing the collection of matter within the wound by interposing any obstacle to its escape. For this reason the adhesive strips should be wide apart, and the end or angle of the wound which is calculated to drain it most completely should be made constantly dependent by fixing the limb or part in a proper position. If the wound be very large, and the discharge very great, the patient may require confinement to his bed to secure this position. More care is necessary in bandaging in these cases, and little compresses by the side of the wound may be often serviceable in keeping the deepest parts of the cut in contact. The simple ointment should cover a wider space in these cases, than in those which do not suppurate, to protect the pus in the wound from the action of the air.

When inflammation comes on, if the orifice be wide, the wound becomes an *ULCER*; if narrow, an *ABSCESS* or *FISTULA*; for the treatment of which, see the proper heads.

*Healing of incised wounds by scabbing.* We sometimes see slight incised wounds which do not gap much, and which

have remained undressed for some hours, covered either by a little scab composed of an excess of the glutinous fluid employed by nature in healing wounds, or of coagulated blood, which after filling the cut has just covered the orifice and become dried there. Under such scabs the wounds generally heal slowly but surely, and if we attempt to remove them, particularly if the skin of the part be thick, as on the joints of the fingers, the palm of the hand, the sole of the foot, &c., we are apt to give cause to troublesome fissures or narrow sores, which it is sometimes very difficult to cure. It is best to leave these cases entirely to nature, or to rest content with merely oiling the scab a little when its contraction causes pain and irritation. In a week or two the crust falls off, leaving the parts well.

*Balsams, &c.* A great many nostrums, such as the red oil, spirits of turpentine, various balsams, &c., are strongly recommended as excellent for fresh cuts! It is useless even to name these articles, for although some of them may prove serviceable in bruises, contused wounds, and punctured wounds at certain times, and under certain circumstances, the application of any remedy to the interior of a "fresh cut" is utterly absurd and ridiculous!—it inevitably interferes with the first great object of nature,—the union by the first intention.

We will now proceed to speak of some peculiarities of treatment required by incised wounds of particular parts.

*Incised wounds of the scalp.* Most wounds of the scalp are made with instruments or bodies much duller than those which produce incised wounds in other parts; but the power of the scalp to adhere by the first intention, exceeds by great difference, that of any other part of the body; and even when this part is torn or lacerated by falls or other accidents, the injury should always be treated like an incised wound.

I have seen nearly half the scalp of the top and left side of the head, a large portion of the skin of half the forehead, the external angle of the left eye and the whole of the left temple torn up, turned back, and covered with chips, dirt, and brick dust, in consequence of the head being caught in falling between the hub of a cart-wheel and a high pile of boards, yet, when washed and replaced, the whole united by the first intention, except the parts about the corner of the eye, and one spot on the temple where it was necessary to tie an artery, and where the ligature prevented the immediate healing. The connexion between the loose flap and the head was formed just above and behind the ear, and did not exceed three inches in length;—yet the scar left on the forehead and temple does not appreciably diminish the remarkable beauty of the young man who was thus horribly injured.

In wounds of the scalp, unless they extend to the temple, where there is a thick muscle covering the bone and one large, though not very important artery, the cases requiring ligatures are exceedingly rare, for all bleeding is easily checked by pressure with a compress and bandage. Stitches are never necessary, and sometimes prove highly dangerous.

After removing every trace of dirt or other foreign matter by washing with a sponge and milk-warm water, the next thing to be done is to shave the head well and freely for several inches round the wound. The edges being drawn together by the adhesive strips, and the simple ointment applied, the whole dressing should be kept in place by a large handkerchief applied as the French do in making their common head-dress, or by a close-fitting night-cap. If any little abscesses should form under a flap of scalp while the rest of the flap is uniting, they should be opened early with a thumb-lancet.

*Incised wounds of the neck and throat.* Those wounds of the neck which neither wound a large artery nor open the wind-pipe, are not generally difficult to treat. If they run across the front or side of the neck, they never require stitches; but to aid the sticking plaster in keeping them from gaping it is best to fix the head in a night-cap and tie it in such a manner as to draw the head downward toward the wound. When long wounds run lengthwise of the neck, it is wrong to apply adhesive strips too tightly, for fear of embarrassing the circulation of the head; but the skin of the neck is so loose that we can always close a wound of this kind without making them tight. No bandage should ever be applied all round the neck; but if a salve be wanting over the strips, it must be kept in place by other strips crossed over the dressings.

When large blood vessels are wounded, none but the ablest surgeon can be of any use unless for a few moments, and in the manner pointed out at the commencement of this section.

When the wind-pipe is opened extensively, the patient cannot breathe except through the wound, which gapes horribly, and the voice is destroyed. Many small blood vessels are divided, and if the wound be accurately closed, the blood is apt to flow into the lungs and strangle the patient. For this reason the suture must never be employed to close the skin in front of the wind-pipe, which should be left very slightly open for a drain. Stitches may be occasionally serviceable at the corners of the wound by contracting its extent, and practised surgeons sometimes venture to draw the ends of the wind-pipe itself together by stitches passed through the cartilages of that tube; but the only mode of keeping the edges of the wound so near together in front as to give a fair chance of an early cure,

is by bringing and confining the head as far forward as possible by means of a cap with strings attached to a band passed round the chest, and in order to prevent the introduction of dust with the breath, the wound must be covered with fine gauze. Of course no individual unconnected with the medical profession would have the madness to attempt the treatment of a wound of this character, except when compelled to do so by dire necessity.

*Incised Wounds of the Chest.* If these wounds are not deep enough to reach the cavity of the chest, they require no peculiar treatment. If they do open the cavity, the lungs on the corresponding side instantly collapse, half the chest becomes filled with air, and the patient breathes with great difficulty by the other side of the chest only. Blood often flows internally, and inflammation of the pleura and the lungs are the inevitable consequence. There is frequently a rushing of air in and out of the wound with every effort to breathe, and if the lungs themselves are wounded, there is generally a cough and spitting of blood. After closing the wound by adhesive strips, it is necessary to be very careful to prevent any danger from the wound being forced open and the dressings being drawn into the chest by the rush of air in breathing; so that if the lungs be not wounded it is generally best to cover the strips with a large piece of fine linen, the centre of which should be spread with simple ointment, and the whole secured by a very broad bandage round the chest, to which the edges of the linen may be pinned or stitched securely. A surgeon should then be procured as soon as possible.

If the bleeding be very great, flowing out more freely when the patient performs the act of expiration, the wound should be covered with a thick firm compress bound on in such a manner as to arrest the flow entirely until the surgeon arrives, and the patient should repose on the side next the wound.

In those cases of wounds of the lungs which bleed with rapidity, the lancet must be used without scruple; the most absolute rest and freedom from excitement both of mind and body are requisite; and the diet as well as the general treatment must be such as to reduce the patient as rapidly and as low as possible, until the hemorrhage is checked and the violence of inflammation is over. After this, the management of such wounds requires great skill, and depends too much upon the peculiarities of individual constitutions to fall under any general rules. Deformity of the chest, chronic pain, and permanent difficulty of breathing are common results of the most successful treatment, and these cases always display a fearful contest between death, the powers of nature, and the resources of art. If pieces of clothing, dressings, or large quantities of



blood find their way into the cavity of the pleura, troublesome abscesses, fistulæ, and other accidents, sometimes requiring severe surgical operations, and putting life to risk long after the patient rises from his bed, are often among the ultimate consequences of these formidable injuries.

*Incised Wounds of the Abdomen.* In healthy constitutions, superficial wounds of the abdomen are, for the most part, of little consequence. Unless they occur near the rim of the belly, they can scarcely occasion very troublesome bleeding, as there are but two very important arteries on the whole anterior surface. If these wounds be deep enough to divide any of the muscles or tendinous expansions, there is danger of hernia or rupture occurring sooner or later at the spot where the cut is made; and hence, after accurately closing the wound by adhesive strips, we should apply a pretty thick compress of folded muslin over the dressings, and bind it rather firmly by means of a bandage, to prevent the bowels from thrusting the perineum into the wound. This compress should be worn for some weeks after the parts have healed, in order that they may acquire as much firmness as possible, and the bowels must be kept free by fluid diet and medicine.

Even if the cavity of the abdomen be opened—unless the opening be extensive or the bowels be wounded—the case need not necessarily prove serious. The wound should be closed as quickly as possible, and if it unite by the first intention, no farther difficulty need be expected, except from the tendency to hernia, which must be guarded against by the means already pointed out. The best diet is rye mush and molasses, and the best purgative is oil; but small doses, occasionally, are all that can be required, for two evacuations per day are as much as should be permitted.

If the cavity of the abdomen be extensively opened, without a wound of the intestines, these instantly start out at the wound, and soon swell to such a degree as to make it very difficult, if not impossible, to return them. If a surgeon cannot be obtained immediately—as in country situations and on extensive plantations—this is one of the cases in which an intelligent man of great nerve and prudence may save life by offering timely aid. The bowels may be handled with a fine and very soft towel, damped in water at about, or a very little above, blood heat; and if any foreign matter adhere to them, it may be washed off with a soft sponge,\* properly prepared by the apothecary.

These wounds always require stitches, and these must be passed deeply, and brought out at least half an inch from the

\* Common sponge must never be used, as it always contains impurities.

wound on each side. They should never pass quite down to the cavity of the abdomen, unless applied by a surgeon, but they may include a portion of muscle with perfect propriety, if there be any in the way. The bowels being held aside by an assistant, the operator takes a stitch about an inch from one corner of the wound, and ties it: he then proceeds in the same manner at the other corner; and, after reducing as large a part of the protruded bowels as possible, he continues applying stitches alternately on each side, at distances of an inch, reducing a portion of the remaining bowel after forming each knot, until the whole mass is nearly secured within the abdomen. If any portions of bowel show a disposition to protrude between the stitches, these must be carefully reduced before applying the long strips of sticking plaster, which should fill up all the intervals of the suture. A broad piece of lint, spread with simple ointment or lard, over the whole, completes the dressing, for no bandage should be employed.

During both the dressing of the wound and the after-treatment, till the wound heals, the patient should lie on his back, with his hips and shoulders raised by pillows, so as to relax the abdominal muscles as much as possible; he must not be permitted to rise from his bed on any account, and his evacuations must be received in a bed-pan.

Strict, low diet should be enjoined; and if the intestines be not wounded, the patient may drink freely. Purgative medicines, by mouth, ought not to be given, for fear of exciting the abdominal muscles, but the bowels may be kept open by laxative injections.

Even if we fail in uniting by the first intention incised wounds of the abdomen which open the cavity without wounding the intestines, nature generally effects adhesions on all sides, between the bowels and the internal edges of the wound, so as to prevent the inflammation from extending to the whole cavity; and the wound may then heal by the second intention without danger. But these adhesions are sometimes imperfectly formed, and then the inflammation spreads. When this is the case, the patient must be most freely bled, and every thing must be done to avoid the slightest irritation of the bowels. This disposition to general inflammation of the abdomen may be perceived by the increased heat of the belly, an increasing tenderness when touched, obstinate costiveness, sickness of stomach, vomiting, and hiccough. When the two latter symptoms occur, the patient is in extreme danger, and will rarely recover.

When the bowels are protruded in large incised wounds, and one of them is found to be wounded, the treatment depends much on the extent of the wound in the intestine. If

this does not extend more than one-fourth round the bowel, it may sometimes be stitched to the side of the wound, and the remainder of the cut may be closed and treated in the usual way, leaving the feces to escape for a time, until, by bandage and compress, the opening can be healed over, and the natural route re-established. If the wound divide the half or the whole circumference of the intestine, the two divided ends must be drawn out completely to the surfaces of the belly, and there secured, while the attempt is made to heal the rest of the incision. This leads to the establishment of an artificial anus, and reduces the patient to a condition which would be much worse than death, were it not that the advance of surgery has furnished us with two modes of operating by which some of these cases may be ultimately cured.

What has been said on wounds of the intestines, is merely intended to convey general information to the reader, and the author has no idea that any one not connected with the profession, will have the folly to tamper with cases of this terrible nature.

*Incised Wounds of the Joints.* It is of the utmost importance that those wounds which lay open a joint should be closed as speedily as possible, for if the orifice should gap for a few minutes only, a general inflammation of the whole joint is almost sure to follow. This is an extremely troublesome, and—if the joint be a large one, such as the ankle, knee, or elbow—a highly dangerous accident; for the symptomatic fever always runs very high, and the discharges of pus, mingled with the natural secretion of the joints, exhaust the strength of the patient. If he escape the violence of the fever, and bear up under the exhaustion, he is still liable to sink from the formation of small abscesses in the lungs or liver; and, if this danger also passes by, he almost invariably recovers with a stiff limb, which, if its position during the recovery be left to chance, is often an incumbrance during the remainder of life.

The orifice in cases of this kind should be closed as accurately as possible, and should be held so by adhesive strips. If a surgeon be not immediately at hand, this should be certainly done without waiting for the arrival of one. The adhesive strips having been adjusted, there will be generally an oozing of some blood between them. A light compress of muslin or lint, without ointment, should be bandaged over the cut, and the blood soaking into and beneath this compress, will coagulate over the incision so as to exclude the air. This compress should not be disturbed for several days, unless by a professional adviser, but the bandage may be removed from time to time, if necessary. It is absolutely necessary

that the part should be preserved in a state of perfect rest, for the least motion of the joint may be attended with the most serious consequences; and it is therefore proper to apply a long splint in all such cases, so that the patient may be deprived of the power of moving the limb even during sleep.

When any symptoms of tenderness or inflammation appear; leeches must be freely applied; and the first appearance of fever should be met by the liberal use of the lancet, saline purgatives, and strict, low diet.

If we fail in accomplishing the cure by the first intention, the joint will soon become violently inflamed; the synovia, or the fluid which fills the cavity, flows freely, mingled with the pus from the wound. The dressings must then be thrown aside, and a bread and milk poultice, changed twice a day, becomes the best local application; but in these formidable cases the life of the patient depends for the most part upon prompt and vigorous general treatment, varied from time to time, according to the peculiar constitution and condition of the individual. It would be worse than folly to lay down rules for their treatment in a popular work, and the highest accessible surgical talents must be called in requisition.

We will now conclude our remarks upon incised wounds, with some important directions in relation to superficial wounds in the neighbourhood of joints, and the position in which the limb should be kept in order to prevent the motions of the part from putting the cut on the stretch.

In all wounds about the arm-pit or shoulder, after the dressings are completed, the arm should be bound lightly to the side by three or four turns of a broad bandage, and the forearm should be carried in a sling. A sling is equally necessary in all cross cuts about the front of the elbow; but when a long or deep wound takes place across the back of the elbow, the arm should be kept perfectly straight, by a wooden splint extending from the ends of the fingers, and this splint should not be relinquished until the parts have been healed for some days. In similar cuts about the wrist or the back of the hand, the splint should extend from the middle of the forearm to the ends of the fingers. It is even proper to apply a little splint in cuts on the back of the fingers, especially if they cross either of the joints, for these injuries often become extremely troublesome where motion is not entirely prevented. If one finger only be wounded, a narrow splint, running from the middle of the palm to its extremity, will be sufficient for all purposes, and will be found much less annoying than a larger one; but, if several fingers are hurt, the whole hand should be confined upon a splint.



Wounds of the groin require that the patient should be confined on his back in bed, with his body raised nearly to a half sitting position by pillows; and most incised wounds of the leg and foot may be treated by placing the limb in a straight posture, and ordering the patient to keep it so: splints are very rarely necessary.

Wounds of the heel made with the axe are not uncommon, and require especial notice. This part contains a most powerful and important tendon, called the tendon of Achilles, from the old Homeric legend in relation to that hero. All the large muscles which extend the foot and enable us to rise on the toe are attached to the principal bone of the heel by means of this tendon; and if it be divided, the upper part of it is very soon drawn up far away from the inferior part. If it unite in this situation, the new bond of union always remains weak and extensible, so that the command of the foot is in a great degree lost.

If the tendon be completely divided, the advice of a surgeon is absolutely necessary to prevent incurable lameness; but if it be only partially severed, the chances are much better. In either case, the best domestic treatment consists in bending the leg at right angles with the thigh, and binding upon the foot a splint cut into the form of the sole of a shoe, but with an extremity projecting six or seven inches behind the heel, on the under surface of which extremity should be tied the end of a broad piece of roller, (*bandage*,) about a yard, or a yard and half in length. This roller is intended to be thrown smoothly over the back part of the leg and round the front of the thigh, being then returned, to be tied at the place of its commencement. It thus keeps the foot strongly extended, with the toes pointing downward, without interfering with the dressing of the wound, and without embarrassing the circulation, as it would do if the bandage were made to pass all round the limb, instead of merely pressing upon its posterior part. After the splint is applied, the knee should be bent, the wound dressed, and the patient confined in bed, with the limb in this flexed position, which should never be changed during the treatment. The foot should not be put to the ground for six weeks at least, and no force in walking should be exerted for three months after the accident.

*Of Lacerated Wounds*, or such as are made by instruments which tear.

The principal difference between the condition of a lacerated and an incised wound, consists in the perfectly healthy condition of the edges in the latter, and their injured state in the former accident. The parts about the immediate neigh-

bourhood of a lacerated wound are not divided nicely in the precise direction of the instrument which makes them, but are *torn off*, sometimes on one side, and sometimes on the other. They, therefore, present rather a multiplicity of fractures of particular fibres than a clear cut. These fibres are, therefore, found in a debilitated condition, and illy calculated to resist the force of the general circulation which is naturally increased for the purpose of supplying the repairs for the lost and injured parts. The energy of the vital operations going on in these weakened parts is greater than they can bear consistently with health, and they are, therefore, extremely liable to become inflamed. Of course, then, there is much less chance of union by the first intention in lacerated, than there is in incised wounds, but this chance is much greater in some places than in others. A complex organ or tissue, like the skin or a muscle, unites with great difficulty, because the injury done by the tearing instrument is greater in proportion to the strength of the fibres, and the power of healing is less in proportion to the amount of interstitial matter included in the cellular tissue of the part.—(See Sect. on the Reproduction of Parts, p. 133.) In such situations, then, inflammation almost invariably follows a lacerated wound, and it is only after the subsidence of this inflammation that the edges of the wound are able to unite even by the second intention. In the soft, pasty, free cellular tissue intervening between the different organs, it matters very little in what direction a wound takes place, and comparatively slight mischief is done by laceration. Such parts often unite by the first intention, so as very much to diminish the extent of the wound and the danger of exhaustion to the patient while all the other portions are suppurating freely.

Few parts are so extensively or seriously injured by laceration as the blood vessels; and hence follows a consequence of great importance.

When blood comes into contact with dead or very debilitated animal matter, it has a strong tendency to coagulate, and when it reaches the torn and collapsed vessels around a lacerated wound, it generally undergoes this change, so as to clog and shut up their open mouths. Lacerated wounds, therefore, seldom bleed much, unless the larger blood vessels are opened.

These wounds also produce a much more powerful impression on the system in general than those which are made with cutting instruments; for when they are at all severe, the patient sinks immediately into a more or less complete collapse: the general circulation is rendered extremely feeble, and hence there is little or no bleeding for some time, even when the

largest vessels are involved. It is only after the patient has recovered from the collapse, or, in other words, after the reaction has come on, that the danger from loss of blood becomes imminent. The hemorrhage which then occurs is called secondary hemorrhage, and happens much more frequently in lacerated than in incised wounds. The arm, with the shoulder blade and collar bone, have been known to be dragged off by a machine, without producing bleeding!

Two consequences follow from this injury to the blood vessels and the collapse of the system in lacerated wounds: 1st, It is unnecessary in most cases to tie the arteries; and when, from the large size of the vessels ruptured, or the occurrence of secondary hemorrhage, we are compelled to do so, the artery wounded, or the main trunk which supplies the bleeding branches, must be taken up at a distance from the wound; for, if tied very near the lacerated parts, the ligature would ulcerate out, and the hemorrhage might return during the absence of all competent assistance. Of course this operation can only be performed by a regular surgeon, and all that can be done by others is, in cases of great emergency, to plug the wound with lint if it do not communicate with any internal cavity, and to apply compresses and a bandage to check the flow of blood.

In deep lacerated wounds, involving the large muscles, however they may gap, it is generally better to depend upon placing the part in the position best calculated to relax those muscles and approximate the sides of the wound, than to attempt to draw the edges together by stitches, which produce great irritation when they are carried deep, and are extremely apt to cut their way out through the bruised parts. Unpractised surgeons sometimes employ modifications of the suture with advantage in such cases, but unprofessional assistants cannot do so with any safety. When adhesive strips and regular bandaging can be employed in promoting the close of the wound, they should be resorted to: but this is seldom the case when the injury is extensive. The best mode of dressing small lacerated wounds, is to place directly upon them, or over the adhesive strips, a plaster of simple cerate, (*see Index—Salves*;) spread upon muslin or patent lint, so applied as not to cover a great deal of the surrounding skin. If the wound be large and gaping, a light, mild, warm bread and milk poultice, mixed with a little oil, should be applied, and regularly changed once a day in winter or twice a day in summer, until granulations begin to fill the bottom of the wound. If the poultice be changed less frequently, it will either become hard and dry, or sour; and in either case it will act as a powerful irritant. In wounds of any considerable dimen-

sions if they become inflamed, hot and dry round the edges, the poultice should be employed, without regard to the presence or absence of granulations: but in this condition of the parts, the poultice should be cold, prepared without oil, and more frequently changed. If the redness show any disposition to spread generally and widely over the surrounding surface, there is danger of the occurrence of erysipelas, and the case requires a different course of treatment, as will be noticed hereafter.

In all cases, it is of the utmost importance that the wounded part should be kept at perfect rest.

A very good mode of treating lacerated wounds of the leg, is to place the patient on his back, with the limb on a pillow laid in a long narrow box, protected by a piece of oiled silk or muslin, or an India rubber cloth, and then covered with bran. The bran can be washed away with a little soap and water, and renewed at any moment. If the wound be small, the bran will often form a crust over it, beneath which it will heal kindly without the aid of any other dressing.

When, in an incised wound, the granulations have nearly filled the cavity, and begin to rise in places a little above the surface, they sometimes form proud flesh, and require the application of a gentle astringent to give them firmness. A wash formed of the decoction of oak-bark or a little plain or burnt alum in powder, dusted on every day or two, will answer this purpose in most cases; but if the granulations be unusually hard or very exuberant, it is well to touch the whole surface occasionally with lunar caustic; and if the skin around the wound appear extremely delicate and moist, with a disposition to throw off the cuticle before the new fine skin beneath is perfectly formed, then dusting with finely powdered chalk or carbonate of zinc will hasten the completion of the cure.

Lacerated wounds of the chest, if they open the cavity, are almost certainly fatal, and little can be done for them but to exclude foreign substances by light dressings guarded by fine gauze.

Lacerated wounds of the abdomen are not necessarily fatal. When large enough to require the suture, it should be employed whenever the condition of the parts will admit of its use. The stitches should be carried as deeply as possible without entering the cavity, through muscle or fascia, but avoiding the peritoneum, and they should be brought out at least an inch from the edge of the laceration. In other respects, they are to be treated like the wounds already mentioned. The formidable character of these accidents is sufficient to guaranty that their management will not be undertaken by incompetent hands.



Lacerated wounds of the joints, and especially those of the ankle joint, may be sometimes treated on a plan widely different, and with the happiest results. These accidents are often attended by displacements of the bone, and the dislocation must be reduced, or the portion of bone thrust through the skin removed, (which latter operation can be performed by a surgeon only,) before any attempt is made to close the wound. If, then, there be an oozing of blood from the torn surfaces, without a dangerous hemorrhage, the limb must be placed in the position best calculated to relax the edges; and if the form of the wound be such that a bandage properly applied will not close it completely or nearly so, some strips of adhesive plaster may be employed. If the nature of the accident precludes the possible introduction of any foreign substance, such as dirt, chips, &c. into the wound, the larger coagula of blood should be removed with the finger, but the part should not be washed. Stitches should not be employed. The wound being closed as accurately as possible, by the position of the limb, with or without the aid of adhesive strips, the operator applies two or three folds of patent lint over the whole seat of the injury. Then, if the form of the part require it, a compress of muslin is placed upon the lint, and the whole is enclosed in a proper bandage, accurately but not tightly applied. The patient must be strictly confined to his bed, and all motion of the joint prevented. If the knee, ankle or foot be the seat of the injury, the limb should be covered with bran over the dressings in the manner already described. In this mode of treatment the dressings are matted together by coagulated blood, which adheres strongly to the torn edges and the surrounding skin, becoming too hard and dry to putrefy. Beneath this covering the wound heals like an internal laceration without suppuration.

The bandage should not be removed to examine the dressings unless inflammation or fever appear, or unless there be signs of moisture perceptible, showing the escape of a fluid discharge from the wound. When such symptoms demand our interference, we apply a very moist bread and milk poultice without oil, over the dressings, after removing or cutting off so much of the bandage as is not adherent to the lint and compress. A few repetitions of the poultice will bring off the whole mass of covering, and the wound must then be treated on the plan recommended under the head of incised wounds of the joints when they cannot be united by the first intention, (p. 252.)

When inflammation of a joint from a wound is once established, the use of the joint is almost always lost, and the patient, if he recover at all, is usually confined for many months, and rises with an enfeebled or broken constitution. In bad

lacerated wounds of joints, therefore, the question of the propriety of amputating the limb is always started. In the decision of this question between the imminent risk of life or the permanent loss of health on the one hand, and the creation of a deformity on the other; involving also, in both cases, a considerable degree of disablement,—both the patient and the surgeon are solemnly bound, to consider well the station, means of livelihood, social responsibilities, general health, and age of the sufferer. A poor or married man may be compelled to lose a leg to preserve which a rich or single man may afford to run great risk of life. A man of family is bound in honour to ensure his safety at the expense of a deformity, the consequences of which to the youth of high prospects or an unmarried female, may be worse than death. A man of independent estate may sacrifice a right arm where his humbler neighbour must run into any degree of danger rather than fall upon the world's cold charity. As a general rule, American surgeons amputate too little, from a feeling of false pride in accomplishing the difficult.

*Of Contused Wounds.* In wounds of this class the parts around the injury are much more extensively and deeply injured than in either of the preceding varieties. Indeed the external wound is often of very little consequence in comparison with the bruise and its effects. The latter will be described under the head of contusions, and the former will require but short notice here.

The edges of the wound in these accidents are generally debilitated to such a degree that they are incapable of resisting the impulse of the circulation, quickened as it is by the accident as soon as reaction is established.

It therefore commonly follows, either that the edges mortify and come off, or, that they are removed by the absorbents, as being no longer fit for restoration to health. Thus, generally, the wound is enlarged in the first instance, before granulation begins or any attempt is made toward healing.

It follows, of course, that union by the first intention is out of the question, and it is no longer an object to close the wound in the first instance either by suture, adhesive strips, or the methodical bandage. When the injury is not very extensive, it is advisable to apply poultices from the first; but as these applications are peculiarly debilitating in their effects, and must necessarily extend much beyond the limits of the wound itself, it becomes improper to use them when the surrounding parts are severely and extensively bruised, for fear of endangering a wide-spread mortification or a considerable ulceration. In such cases, it is best to dress the wound itself with a mild or gently stimulating ointment, such as simple cerate or

basilicon, (see Index, Salves.) leaving the neighbouring surface free for the application of other remedies which its condition may require. When the mortification of the edges threatens to be extensive, when the constitution of the patient is feeble, and there is danger of a progressive gangrene, the stimulating poultices, such as the yeast poultice, become valuable remedies.

Poultices should not be employed too long in the treatment of contused wounds; for, after the granulations have been once fully formed, they are extremely apt to become flabby or form proud flesh, if kept too moist and warm by the dressings. When a contused wound is long in healing it is proper to consider and treat it as an ulcer, and we will refer to the section on ulcers for further particulars. If proud flesh should make its appearance, it may be repressed by the means prescribed under the last head.

OF CONTUSIONS. A contusion or bruise is an internal wound or rupture. It needs no external dressings to protect it from the action of the air, for it is always covered by the skin, if not by other tissues. When a contusion recovers in the simplest way, the blood which is always poured out from some of the smaller blood-vessels, is gradually changed in colour, from the dark purple or black of the fresh coagulation, through the tints of blue, green, yellow and brown, so well known to all. These changes result from the action of the absorbents, which take up the colouring matter of the blood more rapidly than the solid parts. As the coagulum disappears by absorption, the torn parts again come into contact and unite; but as the serum of the blood is always separated during the act of coagulation, this serum, carrying with it a portion of colouring matter, flows out and spreads in the surrounding cellular tissue; often settling by its weight into parts at some distance from the seat of the injury; as we see in the lower eyelid after bruises on the forehead. The serum is often more slowly absorbed than the solid coagulum, so that we frequently observe a ring of many colours round a bruise which has apparently recovered: but I have never known the serum to give rise to any material trouble.

When the quantity of blood effused is much more considerable, and the part in which it is contained is profoundly injured by the accident, or when the constitution of the patient is in bad condition, the coagulum sometimes degenerates or becomes putrid before the debilitated absorbents can remove it. This leads to the formation of an abscess which, when it bursts or is opened, often gives rise to an ill-conditioned ulcer, difficult to cure. As a general rule, when a considerable mass of blood is poured out near the surface of the body, and after

remaining hard, like a firm coagulum, for a considerable time, becomes quite soft and fluid, so as to convince us that it has been dissolved—it is best to open and evacuate the cavity by passing a thumb lancet very obliquely into it: the attempt may then be made to close the orifice by an adhesive strip, and the whole cavity by a compress of lint and a light bandage; but if, as generally happens, inflammation appears or is increased after the dressing, it must be immediately removed, a proper poultice substituted, and the treatment managed as in other cases of ABSCESS. (See Index.) Collections of blood immediately beneath the cuticle, occasioned by bruises, are usually termed blood-blisters. In these the effused fluid generally remains fluid or very soon becomes altered, probably by the action of the air through the very thin pellicle which covers them. They scarcely ever disappear by absorption, though seated directly on one of the most powerful absorbing surfaces in the body; and if they are opened directly, they become extremely painful and produce severe inflammation or ulceration. It is best to allow blood-blisters to remain untouched for several days, after which their contents may be evacuated by passing a pin or needle for some distance under the neighbouring cuticle before permitting it to enter the blister. In this way the free admission of air is prevented, and the pain and irritation avoided.

When the quantity of blood effused in a contusion is very great, a curious result often follows, which is apt to produce great alarm in the patient and his friends. The air which always escapes from blood as it contracts after coagulation, is forced out in such quantities as to distend the cellular tissue for some distance around the seat of the injury. The part then crackles under the pressure of the finger, and as the dark colour often strengthens the deception, it is supposed that gangrene or mortification is about to take place.

Though the presence of this air endangers the decomposition of the blood, which would inevitably occasion a serious or destructive abscess, yet it is often absorbed without difficulty in a few days, leaving the coagulum to be removed more slowly; and the patient then recovers, sometimes with very few troublesome symptoms, even when the appearances are, at first, very much against him.

Another cause of alarm in severe and extensive bruises, is the appearance, over the injured surface, of small blisters filled with a bloody serum, precisely similar to those which are so often observed when an inflammation is on the point of ending in mortification. But when these collections precede, instead of following the commencement of inflammation, they are not a very



certain indication of danger, although they prove the injury to be both deep and severe.

In very severe bruises, when the patient is thrown into collapse by the accident, it is sometimes advisable to bring on a re-action by giving the patient a glass of wine, or some other gentle stimulant; but the use of the lancet, which is almost always recommended by the ignorant under such circumstances, is extremely improper, and occasions the death or the sacrifice of the constitutions of many. Except in some cases of injuries of the head, no one should be bled after a severe accident until the pulse has risen and fever is about to appear. Then, indeed, it is often proper to bleed freely and fearlessly.

When the inflammation which usually follows a bruise has passed away, leaving the parts in a condition so debilitated that the absorbents are unable to take up the remains of the effused blood and serum, we may often accelerate recovery by bathing or dressing the part with some stimulating application, such as diluted brandy, spirit of hartshorn, camphor, &c.

When bruises occur in parts remarkable for the number and development of the nerves of sensation, such as the ends of the fingers and toes, the pain produced by the accident is very severe, and often intolerable. It is right in these cases to dress the contusion with rags or a very loose bandage completely wet with laudanum; or if the contusion be too extensive for this mode of treatment, a milk-warm poultice of hops and vinegar should be applied. When the pain in these nervous parts results from inflammation, which often comes on some hours or days after the accident, the treatment must be different. Laudanum is then too stimulating, but the solution of opium in water may be mixed with the plain bread and milk poultice which forms the best local application. In bruises and crushes of the fingers and toes, the distressing wakefulness occasioned by this inflammatory pain may be relieved at once by a dose of antimonial wine, just sufficient to produce nausea without vomiting. Laudanum, even when given internally, increases the severity of the complaint.

*Contusions in the great cavities of the body* are more complex and dangerous in their nature than those which are located on the extremities: they are also much more difficult to distinguish and comprehend.

There are two distinct modes in which contusions may occur in the viscera of the great cavities. 1st. The pressure or blow of an external body may crush the bony walls or compress the flexible covering of a cavity in such a manner as to injure the viscera or bowels which it contains: or, 2nd. In falls from a height, when the body is suddenly arrested, the larger and heavier viscera, such as the liver, spleen, brain, &c.

experience a violent jolt, and may be most severely bruised, or even torn from their connexions by their own weight, (momentum,) so as to occasion death without any signs of external injury.

Severe contusions of the great cavities are much more serious in their consequences than similar injuries occurring externally; because the free action of the organs enclosed in these cavities is necessary to life. A blow which temporarily disables a voluntary muscle produces little mischief, because the patient may very well remain at rest until the muscle gradually recovers its power; but when the function (the peculiar power of action) of any important internal organ is arrested in consequence of the application of a mechanical force, death often follows long before sufficient time has been allowed for the organ to recover its tone.

After these remarks the reader will be able to perceive the necessity of a few comments upon contusions of each of the great cavities.

*Of Injuries of the Head.* External contusions of the scalp, when unaccompanied by open wounds, are not of much importance, except sometimes in children. In early life, it occasionally happens that blood is effused immediately under the skin of the scalp, and when the cavity which contains it is opened either by nature or art, the part becomes the seat of a small abscess which proves very difficult to treat. The best practice in such cases is to lay open the whole cavity by two or more free incisions, apply a bread and milk poultice, and leave the abscess to fill itself with granulations from the bottom. A neglect of this course sometimes occasions troublesome or even dangerous disease of the bones.

The special importance of contusions of the head results mainly from the injuries sustained by the brain or principal nerves. These vary in degree and character, so as to demand especial notice.

One of the most simple and common injuries of the head results from the unwarrantable and cruel practice of *boxing the ears*, as a punishment for children. Its consequences are often distressing in the highest degree, and not unfrequently prove fatal to the intellect or life of the sufferer. Even when the blows are lightly struck, the air is forced with great violence upon the drum of the ear, and when that membrane escapes a rupture destructive to hearing,—*an accident which has repeatedly happened!*—the delicate, and exquisitely susceptible nerves of the interior of the ear are compressed to such a degree as to give rise to terrible irritation of their other extremities in the brain. Severe headach is the lightest of the evil consequences of this savage treatment, and, if the punish-

ment be frequently inflicted, fatuity or extreme dulness of mind and temper are a very common result! But even these are trifling, in comparison with other effects by no means infrequent. Epilepsy, inflammation of the brain, and sudden death, may and *do* follow such inflictions, and it is not always that the author of the cruelty becomes aware of his or *her own* agency in the business; for the fatal affections but rarely appear until some weeks or even months have elapsed. If the argument of brute force be really necessary, which, in well regulated families is very seldom the case, for the love of mercy and humanity let it be *the argumentum a posteriori*!

The next accident in violence which claims attention is simple *concussion of the brain, or stunning*. When the head is forcibly struck or suddenly arrested in a fall, the weight of the brain causes it to press forcibly against that side of the skull which receives the blow; and an injury more or less severe results from the violent but momentary compression of this most important organ. In the mildest form of the accident, the jar produces a peculiar bewilderment of mind, followed almost instantly by a sensation of terror, which passes off in a few moments, leaving the patient in health. Concussion, in this degree, scarce ever gives rise to any important consequences, and is generally even less dangerous than a smart box on the ear. Hence, in the falls of young children, if the child cry freely at the moment of the blow, or very soon afterwards, we may generally regard the accident as unattended with danger.

When the blow is somewhat more severe, all consciousness is lost; the surface of the body becomes pale, a general collapse is produced, and it is some time before the patient recovers the command of his senses. If the pupil of the eye be examined at this time, it will be found in a large majority of cases either of its natural size or somewhat enlarged, but very slightly susceptible of the action of light; that is, it does not dilate and contract freely when the lids are alternately closed and opened again.

The limbs are generally found completely relaxed in simple concussions which are not very severe, but in more grave accidents of this class they are often found in a state of spasmodic stiffness, and the pupil may then appear considerably contracted.

This last condition is more threatening, for it proves that the jar has been strongly felt at the origin of the nerves and the attachment of the spinal marrow, while the contraction of the pupil shows the existence of a local irritation coupled with the weakness produced by the shock.

When a patient is recovering from an accident of this cha-

racter he usually complains of considerable nausea, and distressing vomiting is a common symptom in bad cases.

In a few minutes or hours, the symptoms of collapse gradually wear off, leaving in most instances no trace of the injury, other than a general feeling of weakness, lassitude of mind, and perhaps a head-ache more or less severe. Fever sometimes, but rarely appears with the approach of reaction. But the dangers which follow a concussion are by no means confined to the few days immediately succeeding the accident. There is always more or less danger of inflammation of the substance of the brain from the irritation produced by the shock, and this most dangerous affection makes its approach very slowly and insidiously. The first symptom which usually marks its approach is a dull, deep-seated, heavy pain in the head, succeeded by a slight chill or repeated rigors, which soon give rise to an obscure feverishness and a marked tendency of blood to the head, first observed from one to two weeks after the accident. If the progress of the disease be not checked by vigorous treatment, the patient soon begins to display a sluggishness of speech and ideas, with an increasing disposition to sleep; but little pain is experienced, because the substance of the brain, though the judge of all sensations, possesses, in itself, no sensibility whatever. After a time the sleep, or rather, drowsiness of the patient is disturbed by low muttering delirium; and when abscess of the brain results, the commencement of this stage of the complaint is marked in most cases by a peculiar form of convulsion. The patient starts up suddenly in bed; his countenance expresses great anxiety and distress, he turns his head, tosses his arms wildly about for a few moments, and then sinks back on his pillow. These paroxysms are repeated perhaps every two or three hours, but are not attended by a total loss of consciousness. I have never known a case of recovery after this form of convulsion appeared. The patient soon sinks into stupor, and dies in three or four days at farthest.

*The treatment of concussion of the brain* is simple and obvious. In the mildest form of the accident, a few hours' rest and a few days of moderate caution against errors of diet and excitement of mind will render the patient secure from danger.

In the cases marked by temporary loss of consciousness, more care is necessary, and when vomiting occurs the utmost attention should be paid to the condition of the patient. Nothing can be done with safety by unprofessional attendants until consciousness returns, and *bleeding* during the first moments of the shock would be utter madness in simple concussion. As the senses return, the sickness of stomach may be



checked, if necessary, by giving a little peppermint, or by a wine-glassful of a strong infusion of Horsemint, (*monarda punctata*) made with boiling water in an earthen vessel, and then suffered to cool, or by the application of a spice plaster\* to the pit of the stomach.

The patient should be confined to his bed, in a darkened room. His mind should be kept free from all excitement. All loud sounds, and every thing calculated to excite his senses should be prevented, and all persons but his necessary attendants and nearest female relations excluded. This caution should be continued until the patient has recovered entirely from the apparent effects of the blow, which in grave accidents may be protracted for several days.

Costiveness is a common symptom in severe concussions, and it is proper to remove it by active purging; for the counter-irritation produced by such measures, tends to relieve the head from direct irritation. If no professional assistance can be procured, the following prescription may be hazarded—

Take of	Powdered Rhubarb	8 grains.
	Powdered Aloes	2 grains.
	Calomel	4 grains.

Mix these with a few drops of water, and make the mass into four pills, of which two may be given immediately, and the remainder in two hours.

When the urgency of the case requires it, this treatment may be repeated for two or three days in succession; but for delicate females the dose must be diminished to one half.

If fever should come on upon the appearance of reaction, it is proper to abstract a little blood from the arm, and to use cooling drinks, and a gentle saline purgative, such as Epsom salts in divided doses; or the Seidlitz powder.

The diet of a patient who has suffered under a concussion of the brain should be quite low for the first few days, and it is important that all irregularities or excess be carefully avoided for two or three weeks; for until the lapse of that interval, there is always some danger of an excess of inflammation of the brain: and this danger is much increased by the indulgence of the appetite.

Inflammation of the membranes of the brain is a very rare consequence of the class of accidents of which we are speaking. When it does occur, it is marked by violent fever and a phrensied delirium, very different from that which characterizes

\* Take of cloves and cinnamon, passed through a coffee mill, of each a heaping teaspoonful; of black pepper about the half of that quantity. Mix these, and an equal quantity of flour. Make the mixture into a paste with brandy or whisky; spread it upon a piece of muslin 8 inches square, and lay it on the pit of the stomach.

the inflammation of the substance of the brain. The appropriate treatment will be found under the proper head in the medical portion of this work.

*Of Compression of the Brain.* Next in point of importance to the simple concussion of the brain, comes the accident usually termed compression of the brain.

This is always the result of a contused wound of the substance of the organ, and may occur from either of these causes: 1st, The rupture of a blood vessel from over distention, which causes Apoplexy or Palsy, subjects discussed in the medical department of this work. 2nd. Fracture of the skull, which produces this result only in certain instances, and will be, therefore, considered in the sequel of this article. 3d. Falls or blows, in which the brain is compressed against its bony case with such force as not only to bruise, but even to tear its substance, in such a manner as to cause bleeding from one or more blood vessels of considerable size. In this case, the blood, having no means of egress from the bony cavity which contains the brain, necessarily presses upon its substance more and more, as it is forced out of the vessels by the power of the heart and arteries.

Our present remarks refer to accidents of the third class, chiefly.

The collapse of the system which is produced by an injury as serious as that of which we are speaking, always diminishes the force of the circulation, and generally, but not always, prevents the rapid effusion of the blood over the brain. The first symptoms in most cases are therefore those of simple concussion, and the signs of compression appear, and go on rapidly increasing after the patient has showed some signs of returning consciousness. When the ruptured blood vessels pour out their contents freely from the first, the marks of compression and concussion are so confused that it is often impossible for the most practised surgeon to pronounce upon the real nature of the case, and the treatment being equally difficult, it would be folly to pursue the subject here.

The peculiar marks of compression are the strong dilatation of the pupil, and a deep stertorous or snoring respiration, together with a partial or total loss of consciousness, and a partial or complete inability to move the limbs. In the simplest cases, the muscles are perfectly relaxed or palsied, spasms appearing only when the injury has produced an irritation of some or all of the nerves of motion. In a few words, the patient appears apoplectic.

When a patient subjected to a severe fall or blow upon the head, has laboured for some time under the symptoms of con-

concussion as already described,—when he has afterwards recovered his consciousness in part, or completely, and the signs just mentioned as characteristic of compression begin decidedly to approach (particularly if the colour of the face be heightened,) the nature of the case cannot be considered doubtful.

Under such circumstances the treatment required is very obvious. The returning energy of the circulation must be kept down by the lancet, and all obvious re-action rendered impossible by the loss of blood. Physicians of skill, and those only, can venture upon bleeding in those still more alarming cases in which there is reason to suspect an active hemorrhage in the brain, while the system still labours in profound collapse. These are the exceptions of cases to which we have formerly alluded, as warranting the use of the lancet almost immediately after a severe accident.

The recovery in cases of compression without fracture is slow and tedious. The patient, in a large majority of cases, remains subject for a long time to symptoms of palsy, and the loss of power is sometimes rendered permanent.

It is unnecessary to dwell any longer upon the general treatment of compression, for, as it is always attended with more or less concussion and contusion of the brain, the danger of subsequent inflammation and abscess are as great as in the accidents previously described, and in addition to the early use of the lancet, the other remedies and precautions mentioned under the previous head must be employed.

OF FRACTURES OF THE SKULL. A simple fracture of the skull unattended with depression, concussion or compression of the brain, is not always an accident of much importance. The broken edges in such cases cannot be dragged out of their proper position by the muscles attached to them, but lay quietly in their places, and the wound requires no peculiar treatment, recovering as readily as a flesh wound, only that it requires a little more time. It is therefore usual among surgeons to consider fractures of the skull, not among fractures in general, but in connexion with Injuries of the Brain.

There are two accidents occasionally resulting from very simple fractures of the skull which do not directly involve the brain; the one, fatal—the other, highly dangerous.

The first of these is seen when the crevice or fissure runs across the track of some tolerably large blood vessel enclosed entirely within the bone, when this vessel is torn, and when the blood, finding no free passage externally, flows within the cranium and produces compression of the brain.

This accident is most frequent in fractures from blows on

the temple,—when the middle artery of the dura mater or internal periosteum of the head is apt to be torn,—and in fractures of the base of the skull, from smart falls on the feet with the knees in the extended position—when there is danger of rupturing the jugular vein, as it enters the cavity of the head through a hole in the bone toward which the fissure in most cases directs itself.

*The treatment* in such cases is obvious. If symptoms of compression come on gradually after a blow on the head, and the route of a fracture can be ascertained by the finger, especially if it pass toward the front of the temple, we should make a free incision down to the bone, with a knife, as nearly as may be across that part of the track which corresponds with the principal blood vessel known to be enclosed in the bone on that part of the head which is the seat of the injury. In this manner we may sometimes save life by giving an outlet to the accumulating blood. *Surgeons* may do much more in some cases, for they may apply the trephine, and after removing a portion of the bone, may remove part of the blood already effused, and, if necessary, plug the artery. This treatment is of course inapplicable when the jugular vein is injured, for this vessel lies far beyond the reach of the knife.

The second accident to which we have alluded, is the occurrence of Epilepsy from the following cause:—

When a narrow fracture of the skull unites, the bond of union is generally bony; and in this case it is always irregular, occupying more space than the healthy bone. This tumour causes a slight pressure on the brain within, and becomes a source of slow or chronic irritation, accompanied by a determination of blood to the head whenever the patient labours under unusual bodily or mental excitement. This often produces an Epilepsy, the attacks of which complaint may be rendered less frequent, but cannot be cured by the general regulation of diet and medicine laid down in the Medical Department of this work. A severe and dangerous operation has been practised for the relief of such cases, and, in some instances, with success. A portion of the bone over the original fracture, and including the tumour, has been removed by the trephine. The loss of so large a piece of the skull prevents the orifice from being again closed by bone; but a strong fibrous membrane is formed in its place; and, being flexible, this prevents the brain from suffering by pressure.

The dangers of this operation are so great, and the number of cases in which it has yet been tried, so small, that its propriety under any circumstances is still considered questionable.

*Fractures of the skull attended by depression* are gene-



rally productive of the most serious consequences; but the rule is not without its exceptions.

At the time of birth, or in the earlier years of infancy, it is not very uncommon for children to meet with accidents such as are now under consideration. A portion of the skull may be deeply indented, and symptoms of compression of the brain may or may not be presented; but the bones being but partially ossified, and not completely connected together at their edges, the fragments are soon raised nearly to their natural position by the pulsations of the brain, and the head, as ossification advances takes a form accommodated to the slight change of position in its contents. It is seldom necessary to do more than put the child upon a slender supply of milk gruel or panada, (according to its age,) to keep the bowels open, to apply gentle cold to the head, and to avoid all exposures and causes of excitement; such as light, loud talking, dandling, and rocking in the cradle, for two or three days. If surgical aid be required, none but the most able assistance can be of any advantage.

When similar accidents occur in grown children, or adults, if the amount of depression be slight, no symptoms of compression may appear, and it has been decided pretty generally among surgeons, that under such circumstances it is improper to cut down upon the bone, or to attempt to remove any fragment by the trephine, because, by so doing, we convert a simple into a compound fracture. We think that the propriety of this rule depends on the form of fracture. There are many cases of this kind in which the trephine ought to be applied, but it is unnecessary to point them out in a popular work. If the accident itself has produced a wound which lays bare the fracture, then, indeed, it is always proper to extend the cut, if necessary, in order fully to determine the nature of the case.

Fractures of the skull occurring to adults or well grown children, when attended with depression, but not with alarming symptoms, if they be left to nature, too frequently occasion subsequent epilepsy, or severe nervous disorders, which render life a burden.

In fractures with depression attended with serious symptoms, the effects produced are precisely the same with those already described under the head of depression—except that they reach their height, in most cases, at the moment of the accident, instead of coming on gradually, as they do in cases of pressure from hemorrhage. The cause being the diminution of the size of the cavity containing the brain by the crushing in of its solid walls, the effect can be removed only by restoring or raising these walls to their proper place by means

of a metallic lever; and in order to give this lever an entrance beneath the edge of the depressed fragments, it is generally necessary to cut out a piece, often from the sound part of the skull, by means of a peculiar circular saw. This constitutes what is commonly called the operation of trepanning. Of course, the whole subject is strictly professional, and is introduced in this popular work merely to gratify the curiosity of the reader.

When fracture of the skull is complicated with a rupture of the membranes of the brain, or a loss of part of its substance, the danger is always very imminent; but it is a mistaken notion that such cases are inevitably mortal. It is never too late to apply to high surgical authority in injuries of the head.

The treatment of these accidents is rendered more difficult and complex by the infinite varieties in the form and position of the fragments, which in addition to simple compression sometimes give rise to internal bleeding, or wounds and contusions of the substance of the brain, and sometimes to mere irritation of the membranes, from the irregularities of surface presented by the fracture. It would be impossible to give the popular reader any idea of the mode of distinguishing these complications, or the remedies for their relief. The whole subject is one of extreme difficulty, and with the few remarks here given, we will close our observations on injuries of the head.

OF CONTUSIONS IN THE CAVITY OF THE SPINE. Though small, the cavity of the spine is of the utmost importance, in consequence of the nature of its contents. The spinal marrow and the origins of nearly all great nerves of sensation and motion are located within it. It is liable, like the head, to a variety of accidents producing concussion, compression, and irritation of its contents. The thickness and loose texture of the vertebræ or bones of the spine, and their mobility upon each other, render them less liable to injury from falls and blows, and they are additionally protected by the thick and strong muscles which surround them; but this immunity is partly compensated by their liability to sprains and dislocations, in consequence of the number of regular joints formed between them.

Injuries of the spine are scarcely less important than those of the brain, and a wound or severe contusion of the spinal marrow almost always ends sooner or later, in death.

*Fractures of the Transverse and Spinous Procession* or projecting parts of the vertebræ, sometimes occur without any serious injury, and all that is necessary in the treatment of such cases is to keep the patient in the most comfortable atti-

tude for four or five weeks, and to employ the usual measures to prevent or reduce inflammation in the commencement of the case, (see INFLAMMATION) and to pursue the regimen proper in fractures generally, at a later period (see FRACTURES.) When the muscles attached to the broken processes do not of themselves preserve the fragments in a proper position, no mechanical measures can accomplish the purpose, because the fragments are too deeply embedded in the flesh to be acted on by such means, and they, therefore, unite in an unnatural or deformed position; but this is rarely a matter of much consequence.

*Fractures of the Bodies, or Lateral Arches of the Vertebrae, and sudden Dislocations*, almost inevitably occasion permanent compression of the spinal marrow or principal nerves. In all such cases the parts of the body below the seat of the injury are incurably palsied, and there is scarcely a shadow of chance for the life of the patient. If the injury be located low down in the lumbar region, life may be protracted for some months—if in the middle of the dorsal region, several weeks may elapse before the fatal termination—if in the lower part of the neck—the period is limited to a few hours or days; but when the dislocation or fracture occurs near the upper extremity of the neck, the death of the patient follows in a manner nearly or absolutely instantaneous, precisely as an animal dies who has been pithed.

The reason of the variety in the time of death from injuries of the spine is this. The numerous connexions between the great nerves of motion and sensation which originate from the spine in the manner described in the anatomical part of this work, are connected by a regular series of branches with the sympathetic system and the nerves of organic life—any injury, therefore, which seriously impairs the integrity of the spinal marrow, produces a powerful impression upon the vital powers of the internal organs, and as the most important of the vital organs are seated high up in the body, while the palsy and disturbance from injuries of the spine is confined to parts below the injury, it follows that the higher the seat of the mischief, the more speedy is the death.

It is altogether useless to give any information on the subject of the local treatment of fractures of the body or lateral arches of the spine. Some very severe surgical operations may be occasionally warranted for the relief of these accidents, but the friends, nurses, or assistants can do little beyond placing the patient at perfect rest in a convenient attitude. One precaution may, indeed, prolong the life of a patient. It will be mentioned under the head of concussions of the spine.

*Contusions of the Muscles and other soft parts about the*



*Spine, and Sprains of the Vertebrae*, which latter are proper contusions of the ligaments of the articulations, are treated on pretty much the same principles with similar injuries of other parts. They are, however, peculiarly prone to produce severe and long continued pain resembling rheumatism, which it is extremely difficult to remove. After the immediate application of cold or warm ablutions to the part, according to the constitution and sensations of the patient, if inflammation runs high, the diet should be vigorous, and leeches should be very freely applied. When the inflammation disappears, stimulating embrocations, such as the soap or volatile linaments (see Index,) are often highly useful. The best mode of relieving the chronic pains, which often continue for months or years, is by the application of plaster of Burgundy pitch, or hemlock, or, what is far better when obtainable, the sheet India rubber bound over the part for several weeks together. During the whole inflammatory stage, and for some time after, the strictest rest must be maintained, and strong muscular efforts, particularly in lifting, should be prohibited until all traces of the injury have disappeared.

*Concussions of the Spine* from falls or blows, generally produce great weakness, and sometimes complete paralysis of the parts below the seat of the injury. These effects are, for the most part, evanescent, and require no other treatment than rest.

A few hours would usually be sufficient to restore the patient, were it not that the bladder very often becomes paralyzed at first, and it then offers no effective resistance to the accumulation of urine, which it has no power to discharge, if not prevented by artificial means. The distention goes on increasing until the fibres of the organ are stretched beyond the point at which they lose their power of contraction, even after the nervous energy returns; and if this state of things be permitted to continue, the bladder will burst and the patient must die. It is highly necessary, then, that the condition of the urinary discharge should be narrowly watched, and as often as twelve hours pass without an evacuation, the catheter must be introduced. This is the more necessary as the bladder is benumbed by the concussion, and does not become the seat of pain or much uneasiness; so that, in many cases, if the surgeon do not inquire into its condition, the patient may not become aware of the difficulty until after the organ is ruptured! By applying the catheter twice a-day for three or four days, we commonly succeed in restoring the tone of the bladder.

There is one circumstance, in connexion with this matter, which deserves especial attention. It sometimes happens that



the bladder, after being distended to a degree which completely paralyzes it, discharges a portion of urine from time to time, by the mere pressure of the abdominal muscles. This may deceive the friends of the patient and lead to fatal neglect. In such cases, the abdomen will be found swollen and tensé, with a hard, rounded, internal tumour extending from the brim of the pelvis nearly or quite to the navel, which does not disappear even after the imperfect discharges just mentioned. Unless this condition be relieved by the catheter, the bladder may be rendered incapable of recovering its tone for months, or even permanently, and incontinence of urine is the terrible result.

This affection of the bladder occurs also in most cases of fracture or dislocation of the spine, and the same effects are produced upon the rectum; or, if the injury be high up upon the back, the whole of the intestines are rendered torpid or paralytic. These results, (incurable in cases of fracture or sudden dislocation) are among the most important causes of death in injuries of the spine below the middle of the back. It is hardly necessary to dilate any farther upon the treatment in a popular work; for the aid of the surgeon will always be sought when obtainable, and we have said all that can be trusted with safety in the hands of the uninitiated.

*Of Contusions in the Chest.* The bony frame of the chest is at the same time so strong and so elastic, that internal contusions from falls and blows are much more rare than might be supposed. The lightness and mobility of all the organs in this cavity except the heart, together with the peculiar elastic membranous supports, the flexible floor of the diaphragm, and the bed of air furnished by the lungs to the latter viscus—all tend to protect the chest against the consequences of violence. Yet there are many causes which do occasion contusions within the chest, a severe blow directly over the heart might possibly produce a bruise of that organ, and a similar impression on the sternum or breast bone has been known to give rise to an abscess within the front of the chest.

But contusions of the interior of the chest are rarely caused by any other accidents than dislocations or fractures of the ribs or their cartilages. When the fragments in such cases are driven inward, the pleura first, and then the lungs are apt to suffer.

We have already spoken of wounds of the lungs, such as result from their puncture by a sharp, projecting portion of a broken rib, (*see Wounds of the Chest.*) The milder injuries occasioned by an angular projection, or an overlapping of the fragments are seldom extensive, because the lungs yield so readily to pressure.

But the great danger in all cases of contusions of the chest is active inflammation, either of the pleura or the lungs. The former kind of inflammation, when confined entirely to the serous membrane, rarely occasions much pain; while in the latter, the suffering is often intense: but these two affections are generally confused together by unprofessional persons, and often by medical men themselves. Both, when severe, are attended with high fever, and independently of the treatment of the fracture or dislocation, from which they may have arisen, their treatment consists chiefly in repose, rigorous diet, the avoidance of all stimuli, perfect quietude, and the free use of the lancet, when the constitution of the patient will warrant it. The various organs of the chest being seated close to the centre of circulation, and provided with innumerable blood vessels of unusual size, their inflammation from mechanical injuries require more active depletion than those of almost any other part of the body.

A very powerful remedy in lessening inflammation of the chest, is the tartar emetic, given in divided doses, so as to produce decided sickness or nausea; but the history of the internal treatment of this affection belongs, more properly, to the medical department of this work, where it will be found under the heads of pleurisy and inflammation of the lungs. Cold drinks, such as ice water or lemonade, in small quantities, are highly useful; but the external application of cold water, so useful in many forms of inflammation, is generally improper, because it tends to drive the blood inward toward the seat of the injury. When fever runs high, cold applications to the forehead, face, wrists, and ankles are useful, and are much more safe in inflammations of the chest produced by contusions, than in those which arise from internal causes.

*Of Contusions in the Abdomen.* Of the very large, important, and heavy organs contained in the abdomen, many are liable to severe contusion or even laceration from internal forces which leave no mark on the soft and flexible walls of this cavity. These accidents are generally fatal, though recoveries sometimes take place even under the most unfavourable circumstances.

All such accidents produce most serious depression of the system, and the patient rarely recovers from the collapse. When reaction comes on, the case becomes one of a purely internal character, and the treatment being medical rather than surgical, the reader is referred for information on the subject to the appropriate heads in the medical portion of this work. The immediate effects of these accidents are all that interest us here.

*The Liver and Spleen* are suspended upon strong liga-

mentous or membranous connexions, which cannot yield to any considerable extent. Their weight is so great that their substance may be crushed, or they may be torn in part from their connexions, by their own acquired momentum or descending force, when the body is suddenly arrested in falls from a great height. The liver may be torn or contused by a blow which strongly compresses the walls of the abdomen near the short ribs, and bends the edge of the liver upon itself. The spleen itself is not altogether beyond the reach of a blow on the loins.

The first and greatest danger of these accidents is internal hemorrhage, the next, inflammation and abscess. The collapse is always profound, and as it is extremely difficult, if not impossible to determine precisely the nature or extent of the accident, the only direction which can be given to the unprofessional attendant, is to place the patient in a state of repose, and trust solely to the powers of nature, until reaction occurs, when the case must be treated with decision and firmness, in the manner prescribed for inflammations and abscess of the liver, in the medical portion of this work.

*The Kidneys* are very rarely contused by blows; but instances have occurred in which they have been bruised and even ruptured, by blows on the loins from falls, or received in fighting. In such cases, the treatment required is similar to that prescribed under the head of Nephritis or Inflammation of the Kidney, in the medical department. The nature of the mischief is easily determined by the severe and peculiar pain felt in the small of the back, which is only relieved by rendering the back perfectly straight, or by bowing the body very far forward.

It is not uncommon for the kidney to suffer severely in those terrible accidents, which happen so frequently from the caving in of banks of earth; but the mischief done to the abdomen in general, in these cases, often renders the injury of the kidney a matter of secondary importance.

*Blows on or near the Stomach* often produce instantaneous death, probably by the injury done to some of the most important portions of the nervous system of organic life.

*Blows received lower down upon the Abdomen* are strongly resisted by the abdominal muscles; and the plasticity or semifluidity of the great mass of intestines with their contents, tends to neutralize the effect of the force, by distributing it equally over the whole cavity. Injuries from such causes are, therefore, less serious than might be expected, unless the force applied be very violent, as in kicks from horses, and in partial inhumation under falling banks.

All serious contusions of the abdomen are attended with ex-

treme depression. The pulse, if perceptible, is small, weak, and generally frequent; the countenance pale and dejected, with a peculiar expression of pain about the face; and it is remarkable that these symptoms of collapse may be attended with active and severe inflammation of the whole cavity of the peritoneum, which the debility and the absence of pain on pressure would lead the inexperienced to believe impossible. I have seen death following in twelve hours after a contusion of the abdomen produced by a kick from a horse; yet, in this case, extensive adhesion and effusions of lymph, and purulent matter were found on examination in the abdomen. The patient did not complain of severe pain, nor was the pulse at the wrist perceptible at any time after the accident.

When a person has received a severe contusion of the abdomen from the pressure of a heavy weight, or the impulsion of any large body, the bladder is very generally found in a state of temporary paralysis, even when no injury has been inflicted on the spine. One of the first things demanding attention in these cases is, therefore, the introduction of the catheter, if the bladder be not effectually evacuated within twelve hours after the accident—and the instrument must be employed at least once every day until the organ recovers its tone.

In every instance of injury of the abdomen, a surgeon will be consulted, of course, if professional aid can be obtained. When this is impracticable, the greatest care of the attendants should be *to do as little as possible*. The case is generally safest in the hands of nature, until fever comes on, when it must be met by the lancet, cooling drinks and a rigorous diet.

One caution should be always observed from the first. The quantity of food or drink admitted into the stomach at any one time must be very small, as any effort at vomiting produces a very unfavourable effect. If, as sometimes happens, vomiting be produced by the accident, it is right to administer occasionally a little *lavender compound*, *strong mint tea*, the *camphor julep*, or some other of the many popular remedies for sickness; but this must be done with great care, lest by their stimulating effect, these remedies should increase internal inflammation. Obstinate vomiting will not unfrequently yield to the application of a *spice plaster* to the pit of the stomach. In cases of extreme depression, when it seems absolutely necessary to sustain the patient by some stimulus, it may be proper to give a table-spoonful of the *terebinthine mixture* every hour or two.

The best way of making this mixture for such a purpose, is as follows:

Place in an eight-ounce vial,

Pure Spirits of Turpentine,      1 drachm.





and then removing it again by the suction of the syringe; after which, the urine itself will rapidly dissolve the coagulum.

As the condition of the parts renders the introduction of a catheter, in contusions of the peritoneum attended with suppression of urine, a very critical, although a necessary step, the operation should never be attempted except by a practical surgeon, and the aid of such a one should be immediately sought. If the instrument cannot be introduced, it may become necessary to tap the bladder.

When spasmodic stricture occurs, which may be known by acute pain in the part, and by violent straining, it is improper to apply cold: however severe the consequent inflammation may be, warm fomentations are productive of much more relief. One of the best applications is a warm poultice of hops or chamomile. When there is no spasm, cold may be usefully employed, as in other inflammations. If there be laceration of the urethra, an abscess and mortification of the loose cellular tissue about the perineum, terminating in fistula, will almost invariably follow, unless prevented by the most consummate skill.

It is right to combat the inflammation consequent upon contusions of the perineum, by the most vigorous measures in the first instance, if the severity of the injury have not produced a collapse; for if the first few hours be lost, the rapidity of the changes in a part so remarkable for active vitality, renders the formation of an abscess almost certain. The free use of leeches and the lancet, are highly necessary in attempting to arrest the inflammation; but if a tendency to form matter be perceived, it should be encouraged by the application of emollient poultices; and the abscess, when formed, should be opened by an early and free incision.

*Fractures of the Pelvis.*—These accidents are generally fatal, but they owe their fatality less to the injury done to the bones than to the contusion of the soft parts within the pelvis, or the rupture of the urethra, and are, therefore, properly considered in this place.

The most common causes of these fractures of the pelvis are the falling of banks of earth, or the passage of heavy vehicles over the part. Sometimes the wing, or upper part of the ilium (see p. 42,) is broken; and I have known a patient to recover from a fracture of this kind almost without an unpleasant symptom. Sometimes the fracture runs into the socket of the head of the thigh bone; then all motions of the corresponding member are terribly painful, if not rendered impossible; and if the patient recover, it is generally at the expense of permanent lameness. Much more frequently, the bones of the pelvis give way in front and at the sides of the

perineum; and, as these parts are deeply imbedded, and give attachment to powerful muscles, it is impossible to contrive any mechanical apparatus capable of retaining the fragments in their proper places. They are almost sure to wound or bruise the urethra, bringing on obstinate retention of urine; and such cases have invariably terminated fatally.

So severe an injury as a fracture of the pelvis is commonly attended by a profound collapse of the system, and some days usually elapse before inflammatory symptoms or fever begin to appear. The existence of the fracture is known by the inability of the patient to assume a sitting posture; by extreme difficulty and pain when the lower extremity is moved, although, when measured, it is found to retain its natural length; and by a dull grating, perceptible by the feeling of the patient, if not by the ear of the surgeon or attendant.

The only precautions which can be taken, with safety, by the unprofessional attendants, to promote the safety of the patient, in fractures of the pelvis, until surgical aid can be obtained, are these:

The utmost care should be used in conveying the patient from the place where the accident happens to his chamber. The horizontal position should be preserved throughout, and the body supported by two assistants, one on each side, who should face each other, crossing and interlocking their hands, first, beneath the shoulders of the patient, and then behind his buttocks. Another assistant should take charge of each lower extremity, placing one hand behind the thigh, a little below its middle, and the other beneath the calf of the leg. These four assistants should walk sideways in carrying the person. A fifth assistant should follow, holding in charge the head of the patient. All hurry should be avoided, as an hour or two of time are not very important in such cases; and none of the above details should be neglected unless by necessity.

When arrived at the chamber, the patient should not be put to bed until he has been undressed, and, in effecting this purpose, it is extremely improper to attempt the removal of coat, waistcoat, or pantaloons entire. A plain bench, board, settee, or long table should be chosen, and covered with a narrow mattress, or blanketing many times folded. On this, after turning up the tail of the coat, the patient should be gently laid upon his back. One sleeve of his coat being ripped, or cut, from the wrist to the shoulder strap, the latter divided, and the collar cut through, or ripped from the facing, the garment is readily removed by gently raising the shoulders and passing to the opposite side, without disturbing the pelvis. The shoulder-strap of the waistcoat being cut, and the collar detached, it may be removed in the same manner. Next,

having taken off the suspenders, let the waistband of the pantaloons be divided on each side, and rip down the outer seams, by the pockets, to the middle of the thigh, or farther. The back part of the pantaloons may now be doubled backward, and gently drawn down beneath the pelvis; but we should never attempt to pull it down by taking hold of the legs, in the common way, as this will produce terrible pain in most cases. The difficulty is now chiefly over; but, if the stockings require removal, or if, before undressing, it be necessary to withdraw boots, the knee must be firmly grasped by an assistant during the operation.

The bed being properly prepared, (it should be a fracture bed, *see* Index,) a long, soft, roller towel, or folded muslin sheet, is laid across that part of the bed where the pelvis is intended to lie, and just high enough to avoid the danger of becoming soiled by the evacuations. The patient being lifted in the same manner as at first, is then placed on his back, in a proper position in bed. If, on trial, it be found that he experiences some relief by being slightly turned to one or the other side, this may be permitted; and if the ends of the towel be now brought forward and firmly and smoothly pinned, it will be seen that the pain is either decidedly increased or somewhat relieved by the pressure: accordingly, it should be continued or laid aside.

This and strict repose are all that can be prescribed for the relief of the fracture, separately considered, by unprofessional hands, under any circumstances. The treatment of the accompanying injuries within the pelvis, or in the perineum, must be conducted on the plan already laid down for contusions of those parts.

We have been very particular in our remarks on the mode of handling the patient, not only because it is of the utmost importance in the rare cases of which we are treating, but, also, because parts of the same process are requisite in the management of several other injuries of more frequent occurrence; and the reader will have occasion to refer to these remarks hereafter.

*Of Contusions or Sprains in the Joints.*—The nature of these accidents is so well understood that it seems scarcely necessary to describe it. But there are some circumstances, however, which are deserving of notice. In every severe sprain there exists an internal wound, more or less extensive; and, consequently, we frequently observe extravasations to a considerable amount, which often continue to require treatment after the inflammatory symptoms have disappeared.



In accidents of this character the ligaments of the joints are more or less lacerated, torn from their connexions, or violently stretched. It is found that a ligament which has undergone a great deal of extension, recovers its tone and contracts to its original dimensions with extreme slowness: the joint therefore remains weak for many months, and frequently requires a mechanical support for its protection.

The first objects in the treatment of sprains, are the relief of the violent pain produced by the stretching or twisting of the ligaments, and the diminution of the danger of severe inflammation by preparatory measures. The excess of pain being, in itself, an active agent in producing inflammation, the remedies adapted to one of these purposes are generally equally applicable to the other. In patients with healthy constitutions, when neither threatened with the rheumatism nor consumption, a running stream of cold water furnishes means of effecting both designs in a most speedy and effectual manner. This remedy, of course, is inapplicable to sprains of the hip, shoulder, or spine; but in those of the knee, ankle, elbow and wrist it is attended with the happiest effects. The full stream of a pump or hydrant falling upon the injured part increases the pain, in the first instance, sometimes to a degree scarcely tolerable, but if the application be continued, the part becomes benumbed, and the pain soon ceases. In from ten minutes to half an hour, according to circumstances, this effect is produced. This application should be made as speedily as possible after the accident, and must not be arrested until the sensibility of the part is much diminished, or it will produce injury rather than benefit.

In sprains of the thigh, shoulder and spine, rags wet with cold lead water may be substituted, and should be frequently changed until the heat of the part is reduced.

In patients subject to consumptive disease, or rheumatism, and fearful of the application of cold, we may often give great relief, by pouring on the part a stream of moderately warm water, after which the part may be enveloped in a bandage thoroughly imbued with laudanum. These precautions being taken, the patient is seated with the injured part in an elevated position; or, if in bed, it must be supported by pillows. The most absolute rest of the limb must be strictly enjoined upon the patient. When inflammation has become established, the most rigorous local treatment is proper. The diet should be low; and, if fever appears, some blood may be lost from the arm to advantage. This course should be continued until the inflammation has in a great degree subsided. Repeated leeches and the constant use of cold ablutions will be beneficial during the inflammatory stage. After the lapse of five or ten

days, some change of treatment is required; the vital energies of the part have been exhausted, the ligaments have lost their tone, and the absorbents can no longer take up the extravasated blood with freedom. Gentle stimulants will now give vigour, and hasten the cure. Bathing with one of the following articles, which are arranged in the order of their energy of action, will generally be found advisable as the case advances.\* Warm vinegar, warm brandy or whisky, the soap liniment, camphorated spirit, volatile liniment, spirits of hartshorn, spirits of turpentine, decoction of cantharides. As a general rule, the deeper the joint, the more powerful is the application required in the chronic stage. Sprains of the spine, particularly, which endure for a long time, are sometimes much benefited by frictions with the decoction of cantharides in spirits of turpentine. In persons subject to rheumatism, the injured joint is exceedingly liable to attack during the chronic stage of the sprain. The terrible suffering which results, is best relieved by poultices of hops and vinegar, or by the application of plasters composed of two or three drachms of some strong narcotic, such as the extract of belladonna, hellebore, or stramonium, mixed with half an ounce of lard. During the chronic stage, the patient should gradually return to his usual habits of diet, and the injured joint may be carefully subjected first to passive, then to active motions, to prevent permanent lameness. These exercises should not, however, be carried to such an extent as to give the patient pain. When the joint continues feeble for a long time, it is best to embrace it firmly in an elastic flannel bandage; or, if necessary, complete support may be given by means of a proper splint. In very bad cases, months may elapse, before the extravasated blood is totally absorbed; and a much longer time may frequently elapse, before the distended ligaments recover their tone, and restore the joint to its primitive strength. A severe sprain is a more serious accident than a fracture, and should never be ignorantly trifled with, or neglected.

*Of Punctured Wounds.*—It has been customary to treat distinctly of those wounds which are made by long narrow instruments, but which do not penetrate cavities, under the head of punctured wounds. The peculiarities of wounds of this character have been very much exaggerated, and the measures taken to prevent evil consequences from them are often productive of serious mischief.

If a narrow and deep puncture inflame, the swelling of its

\* Those articles which stand last on this list, are only serviceable in old and severe cases. They are rarely useful within a month after the accident; and as most sprains recover in less than a month, they seldom come into play. When used too early, they are very injurious.

walls occasions very painful pressure on the nerves of the part; and if, as often happens, the instrument have penetrated a fascia, or tendinous expansion—(see *Index*,)—the inflammation, and the consequent pressure of the parts beneath against the unyielding fascia may be spread over a wide surface, and produce not only extreme agony, but serious danger to life, even when the extent of the original wound is inconsiderable. Nothing can be more irrational than the popular mode of treating accidents of this character, which consists in soaking the wound with spirits of turpentine or strong lie, for fear of lock-jaw. That there are no cases of punctured wounds in the palm of the hand or the sole of the foot, in which benefit may result from strongly stimulating applications made at a proper time and more proper manner, I will not pretend to say; but this is certain;—in nine cases of ten, the practice will be attended with most unfortunate consequences, and it would be extremely silly for any one unacquainted with surgery to judge what cases would prove exceptions to the general rule.

Punctured wounds occurring in warm weather, and especially such as are located in the foot or hand, require careful watching and surgical advice; but the only safe course for the domestic adviser, when a surgeon cannot be procured, is as follows.

Immediately on the occurrence of the accident, we should order a plain poultice of bread and milk; to which may be added, when the wound is extremely painful, about ten grains of opium to a tea-cupful of poultice. The opium should only be employed at the first dressing, and for the relief of the nervous pain; for after inflammation has become established, the pain will be increased instead of being lessened by such an application.

The poultice should be changed at least once, daily, until the violence of the inflammation is over. If swelling extend rapidly over the surrounding surface, and the intense throbbing pain lead to the supposition that a fascia beneath which the inflamed parts are firmly bound down has been wounded, the skilful surgeon will generally make a free incision through the wound and the fascia, thus converting the punctured into a simple incised wound.

The part, which has received the wound, should be maintained constantly in an elevated position, until the inflammation has subsided. If the arm—it should be carried in a sling; if the leg—it may be supported by one or more pillows in bed, and upon an extra chair during the day. These wounds scarcely ever heal by the first intention, but rarely occasion much suppuration, unless they produce a deep-seated abscess. When the amount of discharge begins to decline, or when the

parts about the orifice appear much weakened, the poultice should be omitted, and a dressing of simple cerate with a loose bandage, applied in its place. The most perfect repose of the limb is often of absolute necessity in deep punctured wounds of the extremities, and suitable splints are then resorted to.

When a punctured wound remains many days but little altered in appearance, and instead of pouring out healthy pus, yields scarcely any discharge, and presents a gaping orifice, lined with a ragged ash-coloured membrane, there is danger of some serious disturbance of the general health, predisposing to nervous spasms or lock-jaw. These are the circumstances which demand the application of local stimulants to the wound, but we do not deem it prudent to prescribe any particular plan of local treatment in a popular work. All that can be safely done by the domestic practitioner, when surgical advice cannot possibly be procured, is to keep the patient on a very mild though somewhat nutritious diet, giving ten or fifteen drops of Elixir of Vitriol in a tumbler two-thirds full of water, repeating the dose twice or thrice every day. The bowels should be kept open, one or two free discharges per diem being secured, if necessary, by mild purgatives. For children under 15 years of age, a Seidlitz powder or a small dose of Epsom salts will answer the purpose; but for adults, it is better to employ some combination containing a portion of calomel. Eight grains of rhubarb, and three grains of calomel, formed into three pills, or taken in powder, with molasses or brown sugar, will be found a safe and efficient dose, and will usually leave its impression on the bowels for three or four days, before it becomes necessary to repeat the prescription.

For some remarks upon poisoned wounds, and the complication of wounds with certain troublesome forms of inflammation, the reader is referred to the medical portion of this work, where the subject of Erysipelas is treated of—that cutaneous disease being somewhat closely associated with many accidents following the infliction of wounds.

## SECTION II.

### *On the Dilatation of Natural Passages, and its Consequences.*

Next to the actual wounds of parts, it is natural to consider their stretching or permanent distention: several accidents of this description may be properly discussed in a popular work;



but, before entering on the separate classes of these accidents, it is necessary to premise some general remarks.

The hollow viscera, the blood vessels, and other canals of the human body, are all intended to contain certain solids or fluids, varying in quantity from time to time, and they are all furnished with a coat of muscular or other contractile fibres, which adapt their dimensions to the quantity of their contents, as has been described in the anatomical chapter of this work. But this power of adaptation has its limits. If nearly or quite all the contents be excluded for a length of time, the diameter of the canal is continually lessened, not only by the increasing contraction of the fibres, which cannot be carried very far in all cases, but also, by an interstitial absorption, which gradually renders the coats thinner and shortens the fibres. If all contents be absolutely excluded, and the continued exclusion be consistent with life, there exists no limit to this absorption, until the portion of the passage thus rendered useless is totally destroyed; the only trace of its previous existence remaining, being a small cord of dense cellular tissue, resembling a delicate round ligament.

If, on the contrary, the contents of a natural canal be frequently or for considerable periods, increased beyond all proper or customary amount, the canal becomes permanently dilated, and the fibres lose their power of contracting to their natural dimensions. We have spoken of this change as occurring to the bladder, in the Physiological chapter, and to the stomach, in the hygienic section on food: our present business is with other effects of similar causes.

This dilatation, far from being generally productive of thinness of the coats of the canal, is usually attended with much thickening and increased strength, which is the result of a hyper-nutrition, by means of which nature attempts forcibly to resist the distending power. The sides of varicose veins are often found thus enlarged to the thickness of one-fourth of an inch; the arteries, in simple dilatation, or in aneurism, which is a somewhat complicated affection, are occasionally found with walls much thicker. The abdominal fascia and tendons, in old hernia, not unfrequently present us with a section measuring ten times the natural amount, &c.

But if the distending force be very great, and the contents of the canal be continually on the increase, so as to render its action constant, (as in aneurism, where the power of the heart perpetually tends to press more blood into the tumour) the powers of nature are at last exhausted, the hyper-nutrition ceases, and this occurs sooner in just proportion to the importance of the organ affected. When this state of things is established, the increasing pressure of the contents occasions a rapid absorption of the walls of the canal, particularly at the

weakest part, and the cavity bursts sooner or later, unless the death of the patient prevent the issue.

We have clearly indicated, in the foregoing remarks, the nature of the accidents spoken of, and the principal morbid changes caused by them. The most rational plan of treatment is plainly deducible from the same remarks. It consists in evacuating, as far as possible, the contents of the canal, and in permanently preventing their reaccumulation in improper quantities; leaving the natural operation of a well known law of physiology to effect the gradual reduction of the passage by interstitial absorption. Other measures than these are required only where the functions of the passage preclude the application of mechanical contrivances or operations; in cases of morbid weakness of the part affected, acting as a cause of dilatation under the action of its ordinary functions; and in cases complicated with diseases of the canal superinduced by, or co-existing with the dilatation. The last named class is by no means a slender one, and some instances of these complications will be mentioned in the present section.

*Dilatation of the Anus.* This affection results chiefly from the habit of costiveness, and the frequent passage of large masses of fæces; but it is much promoted by all causes which tend to produce relaxation of the part and fulness of the hemorrhoidal vessels: among these, the most important are sedentary habits, luxurious living, and uncleanness.

The ill consequences are numerous. An exceedingly disagreeable mucous discharge, sometimes mingled with fecal matter, continually bathes the part; the patient controls his discharges with difficulty, when affected with the slightest looseness of the bowels; the mucous membrane of the canal becomes thickened and diseased, giving rise to itching, a dull, heavy pain in the part, and sometimes to superficial excoriations or ulcerations. The loss of tone in the muscles which close the anus, prevents them from yielding the proper mechanical support to the hemorrhoidal veins, which are the principal blood vessels of the part; and these consequently become enlarged and varicose, sometimes pouring out blood into the surrounding cellular tissue, where it forms little sacs, which, becoming surrounded by walls thickened by hyper-nutrition, form those very troublesome tumours called *piles*. Piles are, therefore, both a cause and a consequence of dilatation of the anus.

Another very annoying accident, often caused by this dilatation, is prolapsus of the anus, as it is commonly called. This consists, usually, of a falling down or thrusting out of the mucous membrane alone, which projects more and more at each stool, until it becomes altered in structure, and is, at length, returned with difficulty. Sometimes, however, it is the whole

thickness of the intestine which descends, being doubled within itself, like the finger of a glove; and the case is then much more serious.

In the treatment of dilatation of the anus, mechanical ingenuity is of no avail; the parts are beyond the reach of any compressing force, except that of their own muscles. The first object is to remove the cause, namely, the occasional passage of hardened fæces in large masses. To effect this, it is necessary to correct the diet by the avoidance of rich food, wines, and much spice, in order to lessen the disposition to costiveness; and then, to employ such measures as tend directly to keep the bowels open. Gentle purgatives and laxatives, such as the Seidlitz powder, Epsom salts, castor oil, rhubarb, &c. may be required occasionally; but it would be extremely improper to depend exclusively upon medicines, in cases requiring a long continued course of treatment. There are many articles of diet, of an opening quality, and these should be the main dependence of the patient. Among the best of them are, such articles as admit of the use of sweet oil, which should be employed freely, and such as are used with molasses. Rye mush and molasses act very powerfully in keeping the bowels open, and formed a very favourite remedy with the late Dr. Physick.

The bowels being duly regulated, the next object is to increase the tone of the sphincters; and this is best accomplished by cold ablutions and exercise. The proper mode of applying cold is by means of a stream of cold water bearing directly on the part. In some of our large cities this is easily managed, by standing in a bath tub, beneath a hydrant, and allowing the water to flow upon the anus; but the apothecaries have always on sale, a large syringe for self-injection, which, by throwing its stream perpendicularly upward, is admirably adapted to the treatment of diseases of the anus by cold water. This remedy causes a strong contraction of the coats of the blood vessels, expelling one cause of distention, while it produces an increased tone in the sphincters, thus diminishing the diameter of the canal. The effect of exercise is to promote the regular action of the bowels, and to strengthen the external sphincter of the anus, which, contrary to the common opinion of anatomists, is a voluntary muscle; and an increase of its strength by exercise, has an important influence on the dimensions of the anus. The exercises which tend most powerfully to effect this purpose, are dancing, running, leaping, and jumping the rope. These are not only useful in producing a diminution in the canal, but they also tend, by increasing the tonic pressure of the muscles, to remove piles, when already existing, and, by promoting cleanliness and relieving irritation, to check the disagreeable mucous discharge.

When the habitual moisture of the part gives rise to very troublesome itching or painful excoriation, the greatest relief is obtained by introducing into the rectum a very small suppository of tallow or suet before going to stool, and by keeping the orifice constantly dusted lightly with prepared chalk or the carbonate of zinc, during the intervals between the daily use of the cold water.

Although piles are spoken of as one of the consequences of this form of dilatation, yet these tumours are so important, and are produced in so many other ways, that it is much better to treat of them in another place.

The prolapsus ani, or coming down of the anus, is not always attended by the dilatation of the canal, for it may be produced by severe straining at stool at any time, particularly in children; and it may occur as a symptom of certain other diseases; but this seems to be the most proper place to notice it. The accident may be recognised by the formation of a soft red tumour all around the anus, at every stool. This, at first, retires of its own accord in most cases, immediately after the close of the evacuation; but as it continually increases in size by repeated descents, it soon requires the aid of the fingers to replace it. After a time, its bulk becomes so great that even this is difficult, and in some sadly neglected cases, impossible. The prolapsed part soon becomes subject to severe inflammations, which thicken it permanently, weakening the patient by a perpetual discharge of matter, and rendering reduction extremely difficult and painful. Sometimes the tumour becomes strangulated by the sphincter muscles: the pain is then horrible, all discharges are arrested and, unless relieved, the patient must die; but some instances have occurred in which the protruded part has mortified and fallen off in time to save life, without any surgical operation. In old cases, the protruded part, even when of enormous size, has been known to remain down for years without preventing the evacuations; and the mucous membrane, in these cases, becomes gradually converted into skin!

To reduce a bad prolapsus ani, we should commence by pouring freely over the part cold or tepid water, according to the condition of the constitution and the degree of inflammation in the tumour. The patient is then to be placed on his back in bed, with his buttocks drawn down nearly to the foot, his shoulders and buttocks well raised by cushions, and his heels drawn up to his thighs. An operator with smooth hands, well greased with lard, places himself at the foot of the bed, and presses the tumour gently upwards, with the palm of one or both hands, according to the size of the swelling, for a considerable time. This pressure is designed slowly to empty the blood vessels, and



thus diminish the projecting mass. The assistant then continues the pressure with the fingers of both hands, while, with both his thumbs, he gradually and slowly thrusts the central portions of the tumour from without inwards toward the little depression which marks the extremity of the canal of the gut. Thus, those portions which descend last are reduced first; for it is folly to attempt to return the whole mass at once. When the reduction is apparently complete, the forefinger of the right hand, well oiled, should be introduced as high as the middle of the third joint, to place the last folds entirely clear of the canal of the anus; and the patient being directed to avoid all straining, the finger is to be withdrawn very slowly, by turning it gently, first in one direction and then in the other.

If the case be very painful, and the patient strong, he may lose blood from the arm pretty freely before the operation. If the inflammation be very great, and the tumour appear likely to prove very obstinate, *small leeches* may be plentifully applied before the cold. In bad cases occurring in adults, forty drops of laudanum may be given fifteen minutes before the employment of pressure.

The reduction being completed, and the patient made comfortable in bed, if no laudanum have been given previously, the dose just mentioned should be now administered, to check any call to stool for a day or two; and the food allowed should consist of gruel, exclusively, for some days; after which, the rules of diet laid down for cases of dilatation must be observed.

Mr. Gooch invented a peculiar truss, to prevent the protrusion between the stools which is apt to occur spontaneously in very bad cases of dilatation of the anus. This instrument is noticed in the American Cyclopædia of Practical Medicine, Art. Anus. By referring any intelligent surgeon's instrument maker to this work, with a note of the height, and the measure of the circuit of the pelvis, the patient may obtain the machine to order at any time.

The above directions are all which can be given with any safety, to the best informed domestic practitioner. For the relief or cure of even the worst cases of prolapsus ani in which the above described measures fail, many severe, but successful surgical operations may be performed; but these require high skill, and the very description of them would be unintelligible to most of our readers.

*Of Dilated, or Varicose Veins.*—The effect of the weight of the column of blood in distending and rendering diseased the veins of the lower extremities, particularly in tall men, the effects of tight garters in producing the same effect, and

the similar influence of the pressure of the womb in pregnant women, together with a notice of the local dropsies, or swellings, of the legs which are consequent to this embarrassment of the circulation, have all been mentioned in the first part of this work. (See CIRCULATORY APPARATUS.)

When varicose veins are bad, the whole of the affected limb appears as if enveloped beneath the skin by innumerable large, blue worms, while the skin itself presents multitudes of redder tortuous lines, which might be mistaken for their infant progeny. These are the dilated veins, with their coats enormously thickened by hypernutrition, or morbid nutrition. Along their route we observe, every here and there, a hard knot, or tumour; this is a valve, morbidly altered in texture, and rendered useless by the disease. The circulation through these enlarged canals is slow and difficult, so that the blood actually coagulates in places along the sides of the vessels; and, notwithstanding the increased nutrition of the coats of the veins, and the serous deposits in the cellular tissue which often enlarge the whole member prodigiously, the general nutrition of the limb is rendered extremely feeble and inefficient; the muscles losing their colour and strength rapidly. After a time, it often happens that nutrition ceases altogether in places, and these parts being removed by the absorbents, extensive ulcers, which are nearly or quite incurable in their nature, are created. We may heal them again and again in some instances, but the moment the patient quits his bed and attempts his usual avocation they are almost sure to recur. Our only resource is the partial relief of the varicose condition of the veins by surgical measures, for a complete cure of this affection we hold to be impossible.

It would be a reasonable inference that, as the pressure of the incumbent column of blood is the principal cause of varicose veins, the recumbent position would be the best during the treatment. But, it is found that the removal of the accustomed and natural pressure from the veins soon produces a loss of tone which causes them to yield to distention the moment that pressure is restored. Although the vessels when in health soon regain their power, becoming even stronger in consequence of the previous repose, yet, when diseased, the immediate mischief resulting from the subsequent distention outweighs the benefit of the repose. It is best, therefore, when treating varicose veins, or the ulcers which they produce, by means of remedies which admit of such course, that the patient should be permitted to rise, or even to walk about during the day. All advantages actually gained under such circumstances may probably prove somewhat permanent.

The most powerful, while it is the safest measure for the re-

lief of varicose veins, is pressure. This is effected by means of bandages, or adhesive strips. The latter are objectionable, because they irritate the skin, and provoke ulceration.

In applying a bandage for this purpose it is absolutely necessary that the roller should commence at the very toes, where its pressure should be greatest, and that it should press regularly and smoothly on every part of the limb, up to the summit of the enlarged veins. It is improper that the pressure should be very firm at any point; for strong compression continued for any considerable length of time invariably weakens the capillaries so as to occasion at least a temporary enlargement on the removal of the bandage. We think there is even an advantage gained by removing the pressure daily for an hour or two, to accustom the vessels to the force of the circulation while the patient is in a recumbent position.

Practised surgeons generally prefer domestic muslin for making their bandages, because, by the hands of the skilful, it is applied with great accuracy and security; but, as slight irregularities in such a bandage are often productive of the most serious irritation in consequence of the unyielding character of the material, it is unsafe in unprofessional hands. A much better article for domestic practice is the common red flannel, which is elastic, and slight irregularities in the application are, therefore, less important.

This pressure by bandage must be kept up for many weeks in order to produce any beneficial change in the coats of the veins, and even then, as the principal cause of the disease, namely, the pressure of the column of blood, cannot be removed, there is a very strong probability that the disease will, ere long, return in full force. To prevent this, it is customary to wear a laced stocking of woollen netting or buckskin, which will permanently assist the vessels in supporting the weight of the blood.

When varicose veins are complicated with ulcers of the legs, the latter require a local treatment that will not interfere with the application of the bandage. It is usual, and, we believe, proper to draw the edges of the ulcers strongly together by long and broad strips of adhesive plaster, until the size of the sores is much diminished, or until a diffused redness of the skin and an eruption round the strips gives warning that the skin is intolerant of the plaster. Over the adhesive strips, or if these be not employed, immediately on the sore, we lay a piece of muslin or patent lint spread with simple cerate or basilicon ointment just large enough to cover the ulcer. On this, again, we place a thin compress of somewhat larger dimensions, and then proceed to apply the proper bandages. The ulcers should be washed off with castile soap

and water every time the dressing is removed, and if the ointments be found, after a time, to disagree with them, their surface may be dusted with powdered chalk or the carbonate of zinc, for two or three days; after which the ointments may be reapplied.

The attempt is sometimes made to effect a cure of varicose veins by means of a surgical operation, and partial success is occasionally obtained. Nearly all the superficial veins of the lower extremity are first collected into a few great trunks, at the inner side of the thigh; and these, again, are finally united into one. The operation of which we are speaking consists in cutting out about half an inch of this single trunk, or of the two or three which immediately form it; so that when the wound is healed, the route of circulation through these veins may be arrested, and the blood compelled to flow through deeper channels. It is found that nature begins to contract the dilated canals as soon as the amount of circulating fluid and the direct pressure of the whole column of blood have been diminished by the operation.

*Of Varicocele.*—This disease is exceedingly common. It consists in a varicose condition of the veins of the spermatic cord; and it is very remarkable that, in nine cases of ten, the left testicle only is effected. The complaint gives rise to a dull, heavy pain or uneasiness about the testicle, and in bad cases, the gland is often diminished in size. When varicocele occurs, as it very often does, among young men of the most moral habits, it will be generally found to disappear spontaneously after marriage.

The disease is frequently mistaken for hernia, and this error has even been committed by regular medical practitioners, though such an extremity of carelessness is hardly credible. The deep blue of the enlarged veins seen through the skin in some cases, and the wormy or knotty and tangled feeling of the tumour when rolled between the thumb and finger, are signs sufficient to enable the patient himself to distinguish between this and every other affection of similar parts. There are, it is true, certain complicated cases in which it is not quite so easy to perceive the true character of the complaint; but these are rare;—they cannot be judged of by the unprofessional, and, therefore, need not be here described.

The proper means for the cure of varicocele are simple, and readily practised. Cold bathing, and the local application of a stream of cold water, are very important measures; and it is advisable, also, to avoid a habit of costiveness, which tends very strongly to increase the disease. General and free exercise in the open air is highly serviceable, but the remedy on which our main dependence should be placed is a proper



suspensory bandage, an article on sale at all apothecaries' shops. Unfortunately, however, most of these bandages are miserably mal-constructed. They are made *non-elastic* in the body-band and thigh straps, which should yield, in order to render the patient comfortable, and *elastic* in the sac which contains the testicles, where all yielding in the material interferes with the special design of the apparatus. These defects are remedied in the best suspensory for varicocele which we have seen. It is contrived by Dr. Heber Chase, of whose trusses we shall have occasion, presently, to speak, and is sold by his agent, Samuel Sheppard, druggist, South Ninth Street, Philadelphia. No doubt it will become generally known and diffused in a short time.

Some empirics, and certain ignorant inventors or venders of trusses for hernia, have the folly publicly to advertise their instruments for the cure of varicocele; and we have seen advertisements of this character seemingly backed by the favourable opinions of men high in the profession. We can scarcely believe these signatures to be genuine; but, be this as it may, it is our duty to caution those who suffer under the disease against the cupidity of any one who would sell such an instrument for such a purpose. A truss may, and often does, give rise to varicocele, and its application while the disease exists invariably renders it worse. We have no patience with the grossness of these deceptions, having witnessed so much, and such frequent suffering consequent upon them.

Very numerous surgical operations, and many of them of the severest character, have been performed for the cure of varicocele; but it is much to be feared that great pain, permanent evil, and sometimes death, are unnecessarily incurred in this manner. There may be occasional cases of varicocele warranting the use of the knife, but the disease is, in a vast majority of cases, more readily and effectually relieved by the measures prescribed above. Varicocele is a source of much inconvenience, and sometimes occasions disgusting deformity; but it is not a dangerous disease, and we should be careful how we institute a dangerous treatment for its relief.

*Of Piles, or Hemorrhoids.*—The word pile has been applied to so great a variety of tumours about the anus, differing more widely in their cause and character than in their appropriate treatment, that it seems necessary to include them all under one general head, in a popular work: and as the two most common and troublesome forms of disease result from dilatations of the venous system, this seems the proper place to introduce the whole subject.

The term hemorrhoids, or piles, is applied to at least three kinds of tumours, situated about the anus, which it is very im-

portant to discriminate from each other. The first of these consists of an enlargement, or dilatation of the veins of the part. These hemorrhoidal varices are of a dark bluish colour, soft and elastic to the touch, somewhat resembling ripe grapes: when compressed by the finger, they are diminished, but return to their former state as soon as the pressure is removed. These tumours can be traced far up into the rectum. Their shape is different from that of other piles; they are broader at the base, and rounder. Sometimes they are found distributed in clusters. It is principally this kind of tumour from which proceed the severe bleedings by which the disease is sometimes rendered formidable and dangerous. These tumours do not often, like the other varieties comprehended under the same name, admit of excision.

The second and most frequent kind of hemorrhoidal tumours is first seen in the form of small fleshy tubercles, generally of a brownish or pale red colour. They may be situated either within the rectum, or about the edge of the anus. In the latter case, they are pale, elastic, and have a spongy feel. Their surface is smooth, and their appearance semitransparent. Sometimes the anus is completely encompassed by the tumours, but more generally they appear on one or both sides, leaving an interval. In either case, the shining and smooth membrane which covers them appears to be continuous with the lining of the lower portion of the bowel, and to possess in a degree the same character. They are often found to contain a central cavity filled with fluid or coagulated blood, which appears to have entered through the minute vessels. The cavity does not usually exceed the size of a pea; but is sometimes large enough to contain several drachms of blood. Frequently the whole substance of the tumour is infiltrated with blood, contained in canals which have lost their original connexions with the veins, and when this is discharged, by design or accident, it collapses and becomes like a loose fold of skin. These piles often subside spontaneously. When such piles have for some time been subjected to the pressure of the sphincter from above, and of external substances from below, they become harder and more permanent, and form a source of almost constant irritation, preventing the patient either from walking or sitting, and causing by their presence an urgency and pressing down, which often occasions actual prolapse of the bowel. This last condition of the hemorrhoidal tumour which has been just described, is commonly called the blind piles, and is found exclusively about the verge of the anus; but closely connected with blind piles, and apparently dependent upon an extension of the same morbid actions, are the caruncular piles or hemorrhoidal excrescences, which are of a more indolent character, and often

continue when the cause which produced them has ceased to operate. These caruncles are soft and compressible, of a red colour, and frequently attached by a narrow neck to the surface of the perineum.

The third production to which the name of piles is commonly but perhaps improperly applied, is more decidedly of a warty character than that just described, is found at a greater distance from the anus, and appears to depend on a different cause, as it has no apparent connexion with the veins. It is easily removed by excision, and requires no farther notice.

The remote causes which produce the two first mentioned forms of piles, are to a considerable extent identical, and are numerous. We have already mentioned the effects of dilatation of the anus in producing them, and we may now mention as a frequent cause, a condition precisely the reverse: *irregular action of the bowels, arising from long continued costiveness* in individuals of rather rigid fibre. In these cases the rectum itself, and the abdominal muscles which act upon it, are thrown into the most powerful contractions in order to expel the hardened feces, while the sphincter remains unyielding and refuses to act in concert. Hence, on every expulsion, the mucous membrane of the rectum and the vessels it contains are caught and detained, and some of the veins strangulated by the forcible constriction of the muscle. This irregular action of the intestines is also liable to take place when any fixed cause of irritation or annoyance is present in or about the bladder. Thus, the presence of stone within the cavity of the latter organ, or an enlargement of the prostate gland which surrounds its neck, may become a cause of piles, or aggravate them if already present. Enlargement of the liver, or a state of pregnancy, by causing pressure on the veins of the pelvis, may likewise become a cause of the affection, especially in the varicose form.

We have already intimated that it is the first of the above varieties of hemorrhoidal affection which has received the name of bleeding piles. It does not always happen, however, that when the walls of the varicose tumour give way, external bleeding follows. Sometimes the blood accumulates in the neighbouring cellular membrane; and the tumour, in place of diminishing, is very greatly increased. In most cases the whole integument yields, and the blood bursts forth very profusely. Repeated accidents of this kind will produce great exhaustion and even endanger life, and where this is not the case the debility consequent on the excessive depletion may bring on dropsy. A less direct, but still serious danger from the bleedings is, that by repetition they will become a settled habit of the system, which cannot be checked without injurious consequences.

Many of the remedies usually employed to arrest hemorrhage, such as cold, pressure, powdered alum, &c., may be employed in these cases, when the bleeding points are accessible; but as the vessels cannot be tied in most cases, and as patients often bleed internally, a surgeon must be called in case of difficulty. Local astringents, with low diet and attention to the regularity of the evacuations, will generally prevent the return of the bleeding.

In the management of piles generally, however, the regulation of the bowels forms one of the most important means, and one which in its application is found most difficult. The employment of powerful cathartics, instead of diminishing, will have a direct tendency to aggravate the affection. If possible, daily evacuations are to be procured by dieting merely, which is best effected by the free use of articles dressed with oil or molasses. Where this cannot be done, the mildest laxatives must be employed. Sulphur has enjoyed the credit of being a specific in this disease; a reputation which it owes mainly to its power of gently exciting the peristaltic action, and perhaps partly to the fact, that, being insoluble, it descends in substance to the lower portion of the intestine and expends its force there.

When the tumours are highly irritable and inflamed, the treatment is that of local inflammation generally, modified by the particular situation of the part. Leeches should first be applied, and the bleeding encouraged; the parts may then be steamed by sitting over the vapour of warm water or the infusion of hops, poppies, &c. If the irritation be not thus subdued, a poultice will be found to afford decided relief. The tenesmus and straining with which this state is often accompanied, and which make an approach to that of dysentery, will generally cease after the introduction of some mild suppository, as recommended in that disease. When, by means like these, the irritability is subdued, somewhat harsher measures may be resorted to for the dispersion of the tumours themselves. Cold astringent injections and washes, the powder of galls or catechu, and the dried juice of the garden celendine (*chelidonium majus*) ointments, made of the same articles, plaster of Paris or fuller's earth, reduced to a paste, and the lunar caustic in substance or solution, have been found useful; but the latter can only be employed safely by professional hands. Frequently, however, all these means fall short of the end desired, which is the removal of the source of annoyance, and then the aid of the surgeon must be called in, to remove the tumour by the ligature or the knife. The choice between these must be regulated by the circumstances of each particular case. The former is the most painful and te-



dious mode, the latter is in some cases followed by troublesome bleeding. The size and form of the tumours, the mode of their attachment, and the general habit of the patient, will be kept in mind by the surgeon in forming a decision.

*Dilatations of the Heart and Arteries.* In our rather arbitrary arrangement of subjects, which by most surgical writers are not arranged at all, we can find no better place than this for the introduction of aneurisms and other enlargements of the arterial system.

*Enlargement of the heart* is generally if not always the result of some serious constitutional disease, and is any thing but accidental in character. Among the most common causes are rheumatism and disease of the spine. The subject is introduced here in order to remove the vulgar impression that diseases, or at least changes of structure, in this important organ are necessarily fatal. The heart may be greatly enlarged, yet under a judicious treatment and regimen, the patient may so far recover as to enjoy general good health to the end of a long life.

The heart after dilatation may even recover its original dimensions, like any other dilated canal.

The disease may be recognised by the violent action of the heart; by the frequency of palpitations; by the pulses of the heart being felt over parts of the chest where they are not generally perceived; and by a kind of hissing or rushing sound striking upon the ear, when held near to or in contact with the chest. This sound has been compared to the blast of a bellows, and one very similar is heard in large aneurisms, and in hardening of the valves of the heart, as well as in dilatation.

The treatment of dilatation of the heart must necessarily consist mainly in removing the cause; be it diseased spine, rheumatism, or any other disturbance to the nervous power of the organ; but much may be done in some cases, in arresting the progress or effecting the removal of the enlargement, by lessening the force and frequency of the pulse and the quantity of the circulating fluid. These ends are accomplished by means of rest, freedom from excitement, the careful use of the lancet, strictly moderate and mild diet, and the administration of digitalis—a remedy exerting a singular influence over the pulse, but unsafe in other than professional hands.

*Aneurisms* are large, pulsating, bloody tumours occasioned by the enlargement or partial rupture of arteries. It would be folly to attempt any particular description of these affections, upon which dozens of volumes have been written; suf-

fice it to state that the coats of the vessel where the enlargement occurs are, by some cause or accident, diseased or weakened to such a degree that they are no longer able to resist the force of the blood as propelled by the heart; and they yield to the consequent distention until they resemble a thick bladder or sac, filled with blood, which goes on continually increasing, unless checked by treatment or by nature, until it bursts, and the patient dies. It seems to be a general law of these enlargements, that the hypernutrition or thickening of the coats, which is often carried to a great extent, is never sufficient by itself to check the disease; but nature aids this thickening powerfully, by lining the whole cavity of the aneurism, when it is large, with layer after layer of firm coagulum; until, in some cases, a very small portion of the cavity contains circulating blood. In a few rare instances, these coagula have been known to stop the extremity of the artery where it enters the tumour; and the disease has been thus spontaneously cured. Where an aneurism is situated in some internal part entirely beyond the reach of the surgeon, if it has not advanced too far, there is always a little hope that the precautions and treatment recommended for enlargements of the heart, may prolong life, under tolerably comfortable circumstances, for many years.

When the aneurism is accessible, as when it is in the neck, on the head, in the arm-pit, groin, or extremities, the case should be placed at once in the hands of an able surgeon. The requisite operation consists in tying the affected artery between the heart and the tumour, by which means the admission of blood through the regular route is cut off, and the contents of the tumour stagnate and coagulate, so as to form a barrier against its access in other directions. The walls of the aneurism then display the tendency to contract which is common to all canals when no longer employed.

If the patient live long enough, the whole of the coagula may be absorbed, and the cavity may become obliterated. Of late years, it has been found that aneurisms which lie beyond the reach of the knife may be sometimes effectually cured by tying the vessels which lead *out of them*, instead of seeking those which lead *into them*. The blood then stagnates and coagulates *for want of an outlet*, as in the former case, *for want of supply*.

*Aneurismal varix* and *varicose aneurism* are terms used by surgeons to express certain accidents which sometimes occur in the operation of bleeding from the elbow. The lancet is made to plunge entirely through the vein, and into the artery; thus establishing an unnatural communication between the vessels; which may be either direct, from one to the other, or indirect, through a sac formed by effused blood in the cel-

lular tissue between the artery and vein; both these vessels communicating freely with the sac.

This accident is certainly a great misfortune, not only to the patient, but also to the operator, for the latter is generally ruined in reputation: a consequence which is not always just; for the accident may occur to the most skilful bleeder, when it is absolutely necessary to apply the lancet to a vein which lies immediately over an artery. In most cases, however, the occurrence is due to an unusual distribution of the artery of the arm, which the operator has the carelessness not to perceive. The fact that the artery is wounded, may be known by the blood flowing in jets instead of a steady stream, and by its very bright colour. Some individuals in very high fevers bleed directly from the veins by jets, but the blood is then of a darker colour. When this accident occurs, the hemorrhage is restrained with some difficulty by the bandage, but the external orifice generally closes, leaving the blood escaping from the artery to flow back by the vein; which latter vessel becomes gradually dilated from the elbow to the shoulder, forming a large pulsating tumour at the site of the wound, and communicating a peculiar sensation of thrilling along the whole route of the vein. The use of the arm is commonly lost.

A severe and often tedious surgical operation furnishes the only means of relief in this affection.

*Mother-spots, Aneurisms from anastomosis.* We often observe on the persons of young infants, a few red lines branching out from a common centre or interlacing with each other, which have been compared by nurses to spiders, strawberries, blackberries, crabs, &c., according to certain superstitious prejudices existing among the vulgar. Though marks somewhat similar may be occasioned by mere slight discolorations of the skin, yet a vast majority of them are formed by enlargements of capillary vessels; and although a few very small specimens may be found to remain permanently, during life, without producing material inconvenience, yet with these exceptions it will be found that the disease extends itself to all the surrounding capillaries, which soon form a slightly pulsating tumour of a bright red or bluish colour, supplied with blood by a great multitude of small arteries which enter it on every side. The tumour soon penetrates deeply below the skin, and sometimes intersects much larger blood vessels. Its growth is, in some cases, rather slow, and in others extremely rapid; but, sooner or later, the surface ulcerates, the vessels open, and profuse hemorrhages occur from time to time until the patient's strength is exhausted, and if nothing is done to prevent the progress of the disease, he dies. These tumours may occur on almost any part of the body. The scalp, the face, the breast, the back, and the extremities may all be affected; and sometimes many

tumours occur in the same patient. Some of the most rapid and fatal ones are found on the inside of the under lip; where they are generally of a blue colour, and roll the lip outward toward the chin. Sometimes, but rarely, the disease commences after the patient has arrived at maturity: it is commonly a disease of childhood, and is generally congenital.

It is of the utmost importance that the best surgical advice should be sought immediately in cases of this nature, as a little delay may place the disease even beyond the reach of the knife; no matter how young and tender the patient may be, if the tumour display any tendency to increase in size, it must be taken in hand at once. Sometimes, when the tumour is seated on the scalp, the breast bone, or any other very firm part, it may be cured by methodical pressure with a compress and bandage; especially if the patient be several years of age. The contents of the enlarged vessels being expressed and prevented from returning, the vessels become permanently contracted, and the tumour shrivels up and disappears. In other cases, there are no remedies but the knife or ligature. When the knife is employed, the hemorrhage is tremendous during the cutting, and, if the tumour be large, the life of the patient is threatened. The bleeding arteries are so numerous that it is impossible to tie them as we proceed, as is done in most operations; but the blood seems to flow chiefly from the side of the cut next the tumour; for it is a remarkable fact that, in most cases, the moment the excision of the tumour is completed the hemorrhage ceases in great degree, and there often remain but few vessels requiring the ligature. The operation should therefore be performed with rapidity.

The dangers of the knife may be avoided in some cases occurring in young children, by a method which, we believe, is claimed by Dr. John Rhea Barton, of Philadelphia. Two hare-lip pins may be plunged in opposite directions beneath the base of the tumour, and left projecting at each end, above the skin. A strong ligature being twisted around the four extremities of the pins, must then be drawn tight enough to arrest the circulation in the tumour. If the swelling be very large, this ligature may require to be re-tightened a little from time to time, and in a few days, the tumour will fall off. The only objections to this mode of treatment are, first; that the action of the ligature upon the skin is sometimes, though not always, very painful; and secondly, that it is often difficult to pass the pins entirely beneath the base of the tumour and to bring them again to the surface. The first of these objections is at once outweighed by the security of the operation, when it is practicable; but the second will compel the surgeon to avoid this method in cases of the nature just mentioned; for the conse-



quences of removing a portion only, by means of the ligature; might prove not merely dangerous, but even fatal. The patient might bleed to death from the remains of the tumour, after the ligature has ulcerated off.

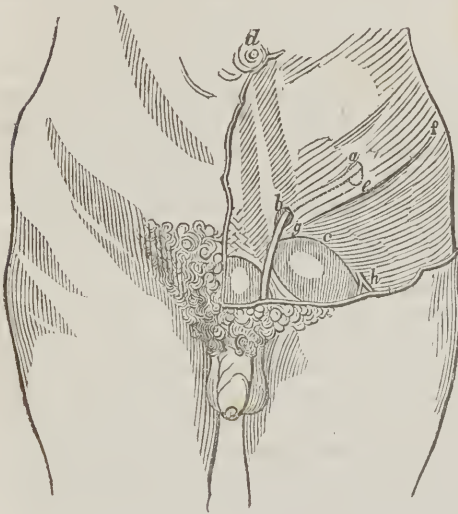
*Hernia or Rupture.* This dangerous and very common disease deserves especial notice in a popular work; because, even in this country, where it is supposed to be much less common than in some parts of Europe, it probably affects every eighth or tenth individual.

The walls of the abdomen, where they are formed of tendons, are provided with certain passages designed to transmit blood vessels or other parts. These passages are not positively open canals, for the coats of the vessels which they transmit are connected with the walls of the passages all around, by a loose and extensible cellular tissue. The pressure of the abdominal muscles upon the bowels, in jumping, lifting, sudden falls, and all violent exertions of the body, sometimes force a portion of some bowel outward through the passages. This accident constitutes hernia or rupture. The bowel always thrusts before it the peritoneal lining of the abdomen, in the form of a sac, within which the bowel lies. The sac tears away the loose cellular tissue of the passage, and stretches the tendinous fibres which surround its outlet. The whole hernia then enlarges into a soft or doughy tumour, according to the nature of its contents, lying beneath the skin and superficial fascia. For some months after the first appearance of this tumour, its contents often return into the abdomen when the patient lies down, and it then disappears entirely. But as every exertion, when standing, tends to force more bowel into the sac, it will soon require some effort with the hands of the patient or an assistant to restore the protruded bowel to the proper cavity. This operation is called *taxis*; and, after the restoration, the hernia is said to be *reduced*. The sac soon forms adhesions with the surrounding parts in its new situation, and cannot be returned; it is then said to be *irreducible*; but this alone, does not prevent the restoration of the bowel. In old cases, the sac is found to undergo, together with the cellular tissue and fascia which cover it, those changes produced by hypernutrition described at the head of this section, (p. 286,) until it is sometimes so thickened as to form a very inconvenient tumour, even without its contents. The bowels now form adhesions to the sac, in some cases, so that they cannot be returned into the abdomen. The patient is then said to labour under *irreducible hernia*. At all stages, even from the first occurrence of the accident, a portion of bowel is liable to be forced down, so large as to occasion the tendinous orifice of the canal to bind the protruded parts like a cord; causing them to inflame and

swell; and if the parts are not reduced, this inflammation so increases the firmness of the stricture, that the circulation is arrested, and the bowel becomes mortified. When this stricture occurs, the hernia is said to be strangulated.

The accompanying drawing (fig. 28,) will give the reader a tolerably accurate idea of the several positions in which hernia usually appears. The figure represents the abdomen and thighs of a man with the skin on one side chiefly dissected off to show the abdominal tendons, and the situation of the principal canals.

Fig. 28.



*a, b,* represents the inguinal canal, left for the passage of the spermatic cord, which is marked out by two dotted lines, and is afterwards seen descending into the scrotum. The cord, while in the canal, and the canal itself, are covered by the thick tendon of one of the great muscles of the abdomen, and, over that, by a fascia, cellular membrane and skin. *a,* marks a little dotted circle which is

called the internal abdominal ring. This is formed in a fascia which covers the peritoneum, beneath the abdominal muscles and tendons. It is the internal orifice of the canal. *b,* is the external abdominal ring, which is formed by a parting of the fibres of the tendon of the great muscle which covers the canal, and is situated just at the bony edge of the pelvis, *g.* It is the external outlet of the canal, and lies beneath the superficial fascia, cellular membrane, and skin. These parts are the most common locations of hernia in men. Sometimes the bowel presses the sac of peritoneum through the internal ring, *a,* into the canal. The accident is then called *common inguinal hernia*. It may happen that the bowel, following the route of the canal, does not reach the external ring, so as to rise in front of the tendon. It is then termed *concealed*

*inguinal hernia.* Sometimes the bowel, covered by the peritoneum, bursts up directly through the internal fascia, by tearing it, and escapes at once through the internal ring, *b*, without passing through the canal at all. This case is called *ventro-inguinal hernia*. In old cases of common inguinal hernia, the bowel enlarges both rings; drawing the upper one down until they nearly correspond, and the canal is destroyed or rendered perpendicular to the surface. This accident is called *direct hernia*. In any of these forms, the progress of the disease may cause such an elongation of the sac as will permit the bowel to fall into the scrotum, which, at last, may become so much dilated as to hang nearly to the knee and contain the greater part of the contents of the abdomen. Incredible as it appears, even the liver, the spleen, the bladder, and the womb, have been occasionally found in hernial sacs!

The line, *g, e, f*, represents the folded edge of the great tendon which marks the upper boundary of the groin, and may be felt stretching from near the pubis to the most prominent point of the side of the pelvis. Just below this, *c*, marks the spot where the tumour generally appears in *femoral hernia*; said to be the most common variety in women. The canal by which this hernia escapes is that which gives passage to the great blood vessels of the thigh. The letter, *h*, shows the saphena vein plunging down to the great vein of the thigh beneath, and will give a tolerable idea of the position of the canal, which lies high up under the fold of tendon *g, e, f*.—*d*, designates the umbilicus; where the vessels going to and coming from the after-birth, enter and pass out of the body of the fœtus before birth. The parts around the scar formed by the falling off of the cord, are never quite so firmly protected by tendon as those at a little greater distance; and hence this spot becomes the seat of a kind of hernia called *umbilical hernia*, which is more common in women than in men.

By kicks, blows, wounds, and other accidents, and sometimes by the growth of fatty tumours between the fibres, the tendons may be torn or parted; and the bowel may protrude at almost any point on the surface of the soft walls of the abdomen, constituting *ventral hernia*. These, and certain internal varieties which are very rare, require high surgical skill, and need not be described in a popular work.

*Symptoms and consequences of strangulation.* As every hernial patient is constantly in some danger of strangulation, and every one who labours under strangulated hernia is in considerable danger of death,—the symptoms, and, to a certain extent, the treatment, should be known to all. On its first occurrence, strangulation is generally mistaken for colic; and except in the severity of the pain at the ring, the pains and

symptoms, for some time, scarcely differ from those of a very bad colic. Almost invariably, there is one loose discharge from the bowels near the moment of strangulation; it is even violent and copious, in some instances; and occasionally, but very rarely, a second follows very soon after. This seems astonishing; as, in most strangulated herniæ, the whole calibre of some part of the intestine is so tightly grasped by the ring, that nothing can possibly pass: but in fact, these evacuations come exclusively from the part of the alimentary canal below the stricture; and this portion once evacuated, all farther passages are impossible until the strangulation is relieved. The exceptions to this rule are exceedingly rare; for even when the tight ring embraces only a portion of the calibre of a large gut, or when it grasps the caul or omentum without any portion of the intestinal canal, the extreme irritation produced, almost always occasions a spasmodic stricture of some part of the gut, which completely closes its passage; and the spasm will continue, if the omentum be not reduced, until the patient dies. Still there are *some exceptions*. I have known a large piece of omentum, strangulated in the common inguinal hernia of a young female, to mortify and be thrown out by abscess, while the patient continued to have daily discharges, though suffering severely with colic pains.

Soon after the strangulation occurs, the hernial tumour becomes tender to the touch, and commences to swell, severe pains are usually felt both at the seat of stricture and about the umbilicus, the latter being often more distinctly paroxysmal. As the case advances, if left to run its course, the tumour increases in size, appears successively red, purple, and livid, while its tenderness becomes continually more marked, and is extended to the abdomen, so that the patient can scarcely bear to be touched on any part of its surface. Contemporaneously with these local changes, the countenance assumes first an anxious, then a haggard expression; the pulse rises and becomes very frequent, then diminishes in volume and becomes gradually more and more feeble and fluttering; while the stomach is affected in succession with nausea, vomiting, hiccough, and finally the discharge by mouth, of fecal matter.

In protracted cases;—those for instance which have continued from four to eight days;—it is usual for the symptoms, when at their point of greatest severity, to cease suddenly and entirely without any return of the bowel, leaving the patient calm and free from pain. This flattering condition of things is the immediate precursor of death. It marks the moment when the mass of intestines inflamed by the accident sink into a state of mortification.



It has been already remarked that when nothing but omentum is embraced in the stricture, the contents of the sac may mortify and come away without destroying the patient. The same thing may happen even when the sac contains mortified intestine, provided the stricture be relieved and the dead bowel laid open in time by a surgical operation. When this result takes place, all feces are discharged by the wound, and the patient is said to labour under artificial anus.

The continuance of life under such circumstances depends mainly upon the spot where the intestine is laid open. If there be length enough above this spot to allow the absorbents or lacteals to take up the greater part of the nourishment contained in the food, the patient lives; but if the opening be much nearer the stomach, he dies of gradual starvation! The condition of a patient with artificial anus would be such as to render life undesirable, were it not that means have been discovered to enable the surgeon to re-establish the route of the intestine by creating a lateral passage from one extremity of the intestine, at the wound, into the other extremity. This was first accomplished by our distinguished countryman, the late Dr. Physick, and his success was regarded as one of the brightest triumphs of the art. The late M. Dupuytren, of the Hotel Dieu, soon afterwards contrived another method of operating for the same purpose; but a Dr. Lotz, a country practitioner residing in one of the interior counties of Pennsylvania, has, by a very happy thought, succeeded in contriving and successfully employing an instrument which seems to promise more usefulness than the plans of either of the great surgeons just mentioned. Some very rare cases of artificial anus are curable without an operation with the knife; but a description of them would detain us too long. The domestic practitioner can do nothing with such cases.

*On the removal of strangulation by the knife.* The operation for hernia, as it is called, consists in making a long incision through the skin, commencing an inch or two above the neck of the sac, and extending several inches below the neck, along the front part of the tumour. The cellular membrane, and any layers of fascia which may chance to lie over the sac after it has escaped through the tendinous canal, are then divided to somewhat less extent; and, the sac being laid bare, some surgeons lay it open and expose the intestine;—a proceeding which others severely censure. *As usual, both parties are right, and merely reason from false predicates:* but the argument belongs exclusively to the profession, and must not be opened here.

The sac being laid bare or open, as the case may be, the sur-

geon then thrusts his fore-finger into the tendinous canal as far as the edge of the stricture which binds the bowel and neck of the sac. Then, taking a narrow, blunt-pointed knife, he lays it flat along the finger, and pushes it past the stricture—entirely into the abdomen if necessary;—and, having entered far enough, he turns the edge up, and divides a few fibres of the stricturing tendon or fascia, in such a direction as to endanger least the neighbouring arteries. The bowel is then easily reduced. This is an operation which, varied according to the kind of hernia, has excited more dispute and discussion in the profession than its importance deserves. It is simple; and in ninety-nine cases in the hundred, easily performed by a tolerable anatomist who has not been too much confused by reading of complexity where no complexity exists. It is not at all dangerous in its own nature, except in the rare case of adhesions between the intestine and the sac, so old and firm as to prevent a practised eye from distinguishing between them. It is true that in opening the sac, the knife has been known to burst into a mortified intestine; but the sooner such an accident happens, *when it can happen*, the better for the patient. We are not able to find on record a case of death from the simple effect of the operation for strangulated hernia; yet it is not entirely without its terrors to young practitioners; for there are several formidable accidents which occasionally happen during or after the operation, to which all are alike liable whether skilful or ignorant. These accidents furnish good opportunities for a grave old surgeon to ruin a beginner by a shrug of the shoulder; and the public should be upon its guard against such interested practices, which are not wholly unknown even in the most liberal of professions.

It will be asked of us, after making so light of an operation considered among the most dangerous, how it happens that so large a portion of the patients operated upon, die within a few days of its performance! The answer is easy. Though the operation for hernia is not dangerous, yet the complete strangulation of a bowel even for a few hours is exceedingly dangerous. It is a standing law of the profession that the knife should not be employed until all other reasonable means of reduction have been tried and failed. The operation is scarcely ever performed in less than twelve hours after strangulation; seldom, in less than twenty-four hours; and not very unfrequently, at still later periods. The *reasonable measures* to which the bowel is subjected during these intervals, will be clear to the reader after our remarks on *reduction*. They are such that if the stricture be not pretty nearly complete, they must restore the bowel; and the patient almost always reco-

vers, if this be effected in a very few hours: though even the partial pinching, in more protracted cases, sometimes brings on inflammation and death after reduction. Now it is clear that the cases operated on at twelve, twenty-four, thirty-six hours, &c., are generally cases of nearly complete, and sometimes, of quite complete strangulation of twelve, twenty-four, &c. hours' duration. It is impossible that a *complete strangulation*, (i. e. one which arrests the circulation,) could continue for even six hours without producing the destruction of the life of the bowel. It is even very singular that a *nearly perfect stricture* should exist twelve hours or longer, without producing at least a fatal inflammation of the strictured part. The reader may now judge how little the operation has to do with the death which so often follows.

Dozens of lives have been and still continue to be sacrificed by the delay of this operation, from idle fears, which might be saved by a little more promptitude in performing it.

*Treatment of strangulation by taxis—Reduction.* The moment strangulation occurs, a good surgeon should be sent for, if possible; but as this is not always the case, not a moment should be lost, by the patient and his friends, in attempting reduction before the arrival of the surgeon. The patient should undress, and lie on his back in bed. The affected part should be thoroughly shaved. If the hernia be not extremely large, and old or irreducible in its character, the following course should be pursued. The head and shoulders, as well as the pelvis, should be strongly raised by pillows. The thighs should be completely bent, and the heels drawn up high in bed. If the hernia should be located in the groin, the thigh on the affected side should be most elevated, and should also be carried a little across its fellow. The patient should now steadily endeavour to return the bowel by the measures which he may have found generally successful in his own case. These efforts may be continued for half an hour; when, if ineffectual, and if no surgeon have been procured, other measures may be pursued by a highly intelligent assistant. The patient, if vigorous, may be freely bled from the arm, and the coldest local applications may be made. When ice cannot be procured, the powder of muriate of ammonia thrown into water, may be used, to produce intense cold. Whatever article is employed, it should be done faithfully: the only precaution necessary is to avoid the actual freezing of the tumour. While this cold is being applied, it is sometimes useful to place one or two heavy smoothing irons upon the hernia; for we have repeatedly seen the reduction happily effected under the steady pressure of such instruments, without the aid of hands. After continuing

the cold for full half an hour, the patient or assistant should again attempt the reduction. If still unsuccessful, the cold should be continued; and if there be much disposition to inflammation about the part, leeches may be applied over or round the neck of the sac. A powerful injection of senna tea and salts, will sometimes do essential service by calling strongly into play the peristaltic action of the lower part of the alimentary canal; and the smallest escape of feces from the strictured bowel will often pave the way for the reduction of large and obstinately strictured herniæ. The taxis should be renewed every half hour; and great care must be taken to act steadily, regularly, and patiently, covering as much as possible of the tumour with the hands, and avoiding any severe pressure upon one spot. The kneading, punching, and violent thrusting frequently resorted to by empirics and inexperienced practitioners, are extremely dangerous, and may destroy the patient even after the reduction is accomplished with apparent success. The direction of the pressure may be changed a little from side to side to advantage, and requires to be varied with the kind of hernia, and its route of escape. Details on this subject cannot be given here, but we would earnestly advise every director of a large manufactory, mining concern, or plantation, as well as every preceptor of a boarding school, to make himself somewhat acquainted with the anatomy of the inguinal and femoral canals, in order to become more capable of usefulness to those under his control. A single day in the dissecting room, with a small fee to the dissector, would put him in possession of the desired information. We might continue the subject of reduction through much greater space, were we to mention the very numerous remedies recommended, and occasionally employed, by various practitioners; but it is believed that the directions already given, are all that can be at once safely and usefully followed by the domestic practitioner.

It may be well, however, to remark that strangulation in very old or irreducible herniæ, is less frequently attended with fatal consequences. Spontaneous reduction not unfrequently takes place in large old herniæ after strangulation has existed for several days. Where the local inflammation in these cases is not very severe, in addition to measures in aid of taxis, as recommended above, the best effects often result from giving an active purge of oil or senna; remedies which might be very dangerous in more recent cases.

*Retention of hernia by trusses—Radical cure.* The truss, and its use in retaining the bowel in hernia, are too well known to require particular description. But the proper construc-



tion of trusses has been shamefully neglected, until recently, by the profession; being thrown entirely into the hands of instrument-makers and pretenders, whose continual changes, and improvements,—so called,—have rendered it difficult to number the modifications: yet until within the last three or four years, no instrument had been invented equal in usefulness to the old-fashioned common truss invented before any of them. None of the trusses invented before the year 1834, were entirely dependable in retaining even the common inguinal hernia completely and permanently. The bowel would occasionally descend, in defiance of the care of the patient, and the truss itself became a source of danger by its action on the bowel. Humanity is indebted to Dr. Heber Chase, of Philadelphia, for the invention of a complete series of trusses adapted to each variety of hernia, and all the complications of several varieties occurring in the same individual; which instruments, after they are once properly adjusted, are capable of retaining the bowel with absolute certainty, under all the exertions required even by laborious professions.

But this is not all—It is found that this certainty and perfection of retention enables the powers of nature to contract the passage in the manner described at the head of this section, (p. 285,) so that after the truss has been worn from nine to eighteen months, the patient generally finds himself radically cured. We believe that this result will take place in not less than nine-tenths of the cases occurring in persons under fifty years of age, and in a fair proportion of cases later in life.

One of the principal operative surgeons of Philadelphia, remarks that the number of cases of strangulated hernia has diminished astonishingly since the introduction of these instruments.

Unfortunately, they positively require to be adjusted and applied in the first instance, by a surgeon who has taken the pains to study their use and construction—and as such a one is not always procurable, it will be frequently necessary to resort, temporarily, to other contrivances. We can recommend none better than a broad, firm bandage round the body, and a thick compress over the navel, in umbilical hernia; the old-fashioned common truss in inguinal hernia; and in femoral hernia, we scarcely know what to recommend. A trial of a number of ordinary trusses may perhaps enable the patient to seize upon one which may support the bowel tolerably well, but no instrument expressly applicable to this form of the disease was even in use prior to the invention of Dr. Chase's femoral truss. This inventor published a *Treatise on the radical cure of Hernia by Instruments* in 1836. It is

replete with information designed for the use of patients and popular inquirers, to whose attention we would strongly recommend it.

## SECTION III.

*On Deformities from Imperfect Nutrition of the Osseous and Muscular System.*

Under this head we may treat of two classes of affections which demand some notice in a popular work; namely, curvatures of the spine, and club-foot.

*Of curvatures of the spine.* These deformities occur from a great variety of causes, of which a considerable class are connected with an exceedingly depraved condition of the constitution, sometimes scrofulous, sometimes cancerous, sometimes syphilitic, &c. These disastrous cases generally result from accidental weakness or unfavourable circumstances surrounding the individual; occasionally, from hereditary peculiarities of the race; as in the case of the Cretins; and now and then, they plainly fall upon the innocent child, as the bitterest of all the curses of Providence upon the errors of the parent. The grave cases to which we allude are those which produce serious alterations of structure in the bones of the spine, and sometimes the entire destruction of the bodies of some of the vertebræ. Such cases generally occur in early childhood; though they are sometimes produced by accidents at an advanced age, in persons of scrofulous or gouty habit. This character is recognisable at once, by the severity of the inflammatory and febrile symptoms which mark the commencement of the deformity, and recur frequently during its continuance.

Every thing in the treatment of these terrible affections, must be made to depend upon the skill and faithfulness of a superior surgeon; for madness only could induce the tampering of unprofessional hands with cases of such a character. Unfortunately, but very few, even among American surgeons, have given particular attention to this subject—partly on account of the rarity of the disease in this country, and partly because most of the cases occur among those whose extreme poverty reduces them to an absolute dependence upon political, or governmental charity; which, boastful as it always is, but seldom furnishes the means for a long and expensive course of treatment in a chronic disease. Our hospitals, which are mostly private charities, reject these protracted cases very

properly; because they would occupy a portion of a limited space to a disadvantage, and exhaust contracted funds which would effect much more good in curing acute and rapid diseases.

The practitioner, being thus cut off from the experience which might be obtained from the treatment of masses of cases in hospitals and alms-houses, necessarily approaches the few scattered patients of a richer order, in his private practice, without the necessary lights.

Unfortunately, the indisposition of the profession to grapple with these more serious diseases of the spine, has induced a neglect, also, of those vastly more numerous and milder curvatures which result simply from relaxation of the ligaments, and deficient tonicities of the spinal muscles.

Of late years, a few practitioners of real merit have given much attention to this subject, and the public faith in empirics and pretenders begins to be on the decline. But the apparatus which is useful, if not essential, to the proper treatment of these deformities, when considerably advanced, is complex, and too expensive for the means of private families and general practitioners. In Europe, such cases are referred to private institutions called *Orthopedic*;—and although an unreasonable and groundless pride, too commonly leads the aspiring surgeon in this country to avoid confining his attention to the treatment of any one special class of diseases, under the erroneous idea that such a course is calculated to lessen his professional respectability, yet we are not without hopes of seeing Philadelphia provided with a respectable *Orthopedic Institution*. Till then, let us lay down the rules which may be safely followed by parents and friends, in checking the progress, or in removing the appearance of such deformities.

Curvatures of the spine from relaxed ligaments and weak muscles, usually occur in young persons approaching the age of puberty, and they affect a far greater number of girls than boys. The rich and luxurious are most liable to such curvatures, but they are seen in many of the children of the poor. It is observed that, in a vast majority of cases, the left shoulder hangs lower than the right; and in females, the dress habitually slips from the former. This is the circumstance which first calls attention to the deformity; but it is by no means the first in the order of morbid changes. The criminal indulgence of fondness for cakes, sweetmeats, and rich pastry, in young and rapidly growing girls, deprives them of their appetite for animal food, which furnishes the most powerful nourishment to the muscular system. The strange notions entertained among the wealthy, with regard to propriety and deco-

rum in female children, cut them off from almost every opportunity of giving active exercise to the muscles, and especially to those of the back, which, therefore, rapidly lose their tone, as will all organs when habitually unemployed. As if these sources of mischief were not sufficient to render the sex sufficiently *delicate*, or, to speak more correctly, *crippled*. Fashion comes in to the rescue, with her stays and corsets, to improve God's image according to her ideas of beauty and symmetry. Bound up in steel or hickory, whalebone, and firm cloth, the unfortunate spinal muscles have so little chance of employment, that too frequently they become shrunken, pale, flabby, and dropsical; the same results being also extended to the ligaments. There then remains scarcely any support to the spine; which, being a long narrow column composed of twenty-four distinct parts, must bend in some direction, if unsupported by mechanical contrivances, the moment the body loses its perpendicularity, as it must do even in taking a single step.

The mal-arrangement of habits and attitudes at school, are admirably adapted to give the greatest possible effect to these causes of deformity. Indeed, it seems to be held essential to the proper worship of the Divinity, and the successful prosecution of learning, that the body should be subjected to physical torture, to promote the due exercise of the mind—witness the perpendicular walls of pews, the backless benches of lecture rooms, and the isolated stools of our seminaries. The human spine cannot be held erect, except by a continued muscular effort, and no spinal muscle will endure half an hour of constant exertion, without becoming completely exhausted: when weakened in the manner above described, it cannot act for ten minutes without repose. If the feeble victim of spinal curvature should attempt to relieve herself by reclining, during the long and unreasonable sessions of the schools,—her seat being unprovided with back or arms, and her right hand almost constantly employed with her book or papers,—she can only accomplish her purpose by leaning with her left elbow upon the desk; and the constant resort to this practice increases the deformity of spine, by weakening still more the muscles which support the left shoulder, and by producing a twisting of the vertebræ, which complicates the curvatures. The ill effects of this attitude have been so frequently mentioned in popular works and lectures, that preceptors generally endeavour to prevent their pupils from assuming it.—“Don't lean on your desk, Miss ——! sit up straight, and hold your shoulders back, or you will grow crooked!”—Such is the usual order; now look to the consequences! The upright position of the spine being altogether insupportable for



more than a few moments, the child endeavours to relieve herself by bearing her weight upon one hip; and, as in most persons, the right upper extremity, and the left lower extremity are naturally stronger than their fellows, it is usually upon the left hip that the patient sits. This attitude compels the child to incline her body toward the left side, to bring about the proper equilibrium. The weight of the whole upper part of the person then bears upon the inclined lumbar vertebræ, which are much more moveable than those of the back, though they suffer less pressure: consequently, as the weak and tired muscles soon cease to give any effective support, the former bones tend continually more and more to the left, until the ligaments which connect them are put upon the stretch, and the balance of the person is again destroyed by the weight of the head and chest. This obliges the sufferer to turn the upper part of the person to the right, by voluntary efforts to recover the equipoise. The two or three lower lumbar vertebræ preserving their inclination to the left, the remainder are now brought back toward the middle line; and the lower dorsal vertebræ, being compelled to partake in the same change of position, the lower part of the spine is formed into a bow, with its convexity looking to the left. When the patient reclines in bed, the bones, for some time after the commencement of the case, slowly resume their natural position; but the daily repetition of the same causes continually increases the deformity, until the weight of the head and shoulders is thrown too far to the right, and continual efforts are made to restore the balance by carrying them again to the left. Even the firmly knit dorsal vertebræ are forced gradually to yield to these efforts by the extension of their ligaments, and the spine of the back of the chest is formed into one great bow, with its convexity turned to the right. This occasions the left shoulder to droop, and renders the right one very prominent. The ribs on the latter side are separated from each other, while those on the former are made to approach more nearly together. A repetition of the same causes finally produces a similar bending of the spine of the neck, in the opposite direction, corresponding with that in the lumbar region.

Such is the history of the formation of the most common form of lateral curvature of the spine—a deformity existing in greater or less degree in nearly two-thirds of the females in refined life. At the commencement the patient can render the spine straight for a few moments, but almost immediately the body falls, and the curves are reproduced. When the deformity continues slight until the patient has reached mature years, it generally remains stationary ever afterwards.

The curvatures just described being once commenced, it is

evident that the weight of the body must act as a constant force, tending to increase their convexity; and that the irregular action of the weakened and displaced muscles, must frequently assist in producing the same evil. From this constant increase of curvature there results, in certain bad cases, a series of changes of a formidable, and sometimes highly dangerous character. The ribs on the side corresponding with the convexity of the dorsal portion of the spine, are separated more and more widely from each other, while those corresponding with the concavity, are made to touch, or even overlap each other; sometimes they even become united by bone. The bodies of the vertebræ become wedge-shaped by their pressure upon each other, and the position of the breast bone is seriously changed. The consequences of these various changes of form, acting on the viscera and the health, need not be dwelt upon; but fortunately, so long as the suspension of the body on the arms, or its steady extension by the shoulders and feet, produces any visible diminution of the curves or lengthening of the body, the case remains, in a great degree, or wholly curable—and if the attack have not been preceded by fever or much local pain in the spine, a great deal of good may be done by the domestic practitioner, in the absence of more scientific advice.

*Treatment.*—The indications to be fulfilled in the domestic management of these cases are, first, to invigorate the whole system by general exercise, free air, and tonics; secondly, to increase the bulk and strength of the muscles of the spine by diet, local applications, and graduated exercise and repose.

General exercise must be nicely regulated in these cases. It should never be carried to such an extent as to produce exhaustion. The debility of the patient will often render her incapable of walking any considerable distance; and the passive exercise of riding, with the more active amusements of bathing and swimming, if ladies may be supposed to swim in America as they do in Europe, are among the most beneficial efforts. The patient should never be permitted to sit, without sufficient supports on every side, to be used when desired. A cushioned and armed rocking chair, with a sloping back, (not concave longitudinally,) is most convenient on ordinary occasions, and a similar chair without rockers, while pursuing studies. As the time spent in the study and the carriage cannot be employed in exercising usefully the muscles of the spine, it is best that they should then be kept in as perfect repose as possible; and this is best effected by a well made corset, calculated to support the figure as nearly in the natural position as possible.

The use of tonics must be managed with some caution, and

whenever febrile symptoms appear during their employment, they must be omitted for a time. The prescription which we have found most generally efficacious, is as follows:—Direct the patient to take a dose of five drops of the muriated tincture of iron, in a wine-glass half full of water, on the morning and evening of alternate days; and on the intermediate days, let her take a wine-glassful of a mild infusion of gentian, columbo, or quassia, on an empty stomach, twenty minutes or more before each meal. If the remedies occasion costiveness, this may be corrected by an occasional Scidlitz powder. The muriated tincture of iron appears to have a peculiar effect in giving firmness and colour to muscular fibre.

The diet best calculated to increase the bulk and tone of the muscular system, is one composed chiefly of the flesh of full grown animals; such as beef, venison, wild game, mutton, &c., but especially beef. The meat is best roasted or cooked on the gridiron, and dressed as plainly and lightly as the taste of the patient will allow. Some have, unfortunately, a great dislike to beef, and it is necessary to avoid pressing and annoying patients to partake of what is decidedly disagreeable either in kind or quantity. Pork is inadmissible in all forms.

Local applications to increase the tonicity of the spinal muscles, often produce very important effects. Before rising in the morning and after retiring for the night, the spine should be well rubbed from end to end with a flesh brush; for which may be substituted, every three or four days, frictions with a rough towel, wet with a saturated warm brine; care being taken to dry the back perfectly, after the operation, and to guard the patient strictly against cold. Extending the application of the flesh brush in a more gentle manner to the rest of the surface is often very beneficial.

But the most important and difficult part of the treatment is the graduated exercise and repose of the spinal muscles. The use of an organ without over-tasking its actual power, increases its strength and size; but by fatiguing an organ frequently, we weaken it. The increase of strength, and actual growth of an organ, under exercise, do not take place during the exertion, but afterwards; and they are much promoted by absolute repose in the intervals of exertion.

The exercise of the spinal muscles, while the weight of the person is pressing down on the spinal column in a state of considerable curvature, is calculated to increase the curves; and repose, however absolute, in the upright position, is also calculated to increase the evil. Such are the principles which should guide us in our practice.

Let a suitable dry garret or chamber be selected, where a fire may be lighted when required. Into one of the middle

beams of the ceiling, secure very firmly an iron staple, from which suspend a rope terminating in a ring or eye, a little above the height of the palm of the patient's hands when held up as high as possible while standing on tip-toe. In this ring, secure crosswise a round wooden stick, two feet six inches long and one inch thick. Cover both ends of this stick with buckskin. On the floor immediately under the suspended rope, place a light stepping block, nine inches square and four inches thick. The apparatus is then ready for use.

Every morning, an hour after breakfast, and every evening, two hours after dinner, the young lady, uncorsetted, should step upon the block, and seizing the covered stick with her hands, she may remove the block a few inches to one side with her foot, and rest with her toes upon the floor. The exercises consist, at first, in suspending a part or the whole of the weight of the body by the arms, according to the strength of the patient. This is done at once by simply bending the knees. The weight of the pelvis and lower limbs then acts as an extending force, and straightens the dorsal and lumbar curvatures of the spine. At first, the debility of the patient will often put a stop to the suspension in half a minute; but when accustomed to the exercise, she will be able to continue it for five or ten minutes at a time. When the arms and ankles feel exhausted, the stepping block may be recalled with the tip of the toe, and the patient may rest at ease; still, however, leaning part of her weight upon the covered stick. When sufficiently rested, the suspension may be renewed, but it must never be carried so far as to lead to positive fatigue.

After the patient has acquired strength sufficient to support her whole weight for some moments, without touching the floor with her feet, she should use the suspension rope and covered stick as a swing; and by gently throwing the pelvis and limbs backward and forward, and also from side to side, all the muscles of the back of the spine will be called into active exertion in a manner calculated to increase their power, while the curvatures are undergoing an actual extension. These exercises may be continued longer and longer from week to week, and must be pursued steadily for several months, before much permanent benefit can be expected.

The moment the exercise is finished, the patient should be conveyed to bed; a good feather bed, not too thick, and laid on a well tightened sacking, being preferable to a mattress. There she should repose upon her back for one or two hours, according to her degree of feebleness. The corset may then be applied, and she may be permitted to rise.

When the patient has so far recovered by the general and local treatment above recommended, that the curvature of the



back is but slightly perceptible, she may take part to advantage in active exercises and amusements without suspension, and among the most useful of these are the plays of battle-door and shuttle-cock, and the graces. The former should be played chiefly with the left hand. Dancing, jumping the rope, and the oft prescribed but highly injurious exertions of waxing furniture, and making beds, should be scrupulously avoided until the increased age of the patient assures us that the existing condition of the spine has become permanent. Nearly all cases of the kind under consideration are curable if undertaken before the age of seventeen, and most of them, if bad, remain nearly unchangeable after the age of twenty.

Before quitting entirely the subject of curvature of the spine, it is right to mention that it is very common, for both young ladies and young gentlemen, to contract a habit of bending the head and shoulders habitually forward, until the back becomes arched, the shoulders rounded, and the head has a confirmed stoop. This exceedingly ungraceful defect is often rendered worse by the means used to cure it; such as stiff collars, and Minerva braces; which, by relaxing the muscles of the back, cause the spine to be much more arched, the moment they are removed. This defect of figure is easily corrected by fitting to the head a cap with a long cord attached to its front margin, which may be passed over a pulley attached to the door or mantel-piece at about the height of the patient's head; a weight of several pounds being fixed at its extremity, the patient, while sitting or standing, amuses himself in drawing the weight up and down, by causing his head alternately to advance toward, and retreat from the pulley. Another method consists in wearing a cap or calash with a padded crown, and reclining repeatedly every day, for as long a time as possible, with the back of the head against the wall and the feet thrust forward one, two, or three feet upon the floor, according to the strength of the patient. This inclined position of the person causes the weight of the body to rest upon the back of the head and feet alone, and the extending muscles of the spine must exert themselves powerfully to prevent the patient from sinking toward the floor, which exercise rapidly increases their strength. Rowing, working with the cross-cut saw, climbing hand over hand, &c. are athletic occupations well calculated to cure the most obstinate stoop.

*Of Club-foot.* We shall say but a few words on this subject, for it is doubtful whether any degree of ingenuity in the domestic practitioner will enable him to be useful in the treatment of the deformity. Yet as most cases are curable if taken in hand before the children are five years old, it would be wrong to let the occasion pass without impressing on parents the ne-

cessity of seeking good surgical advice in time; cautioning them, at the same time, against the boasts of mere instrument makers and empirics.

In club-foot, the bones of the leg are sometimes defective in form, one or the other being too short at the point, or they are dislocated from each other before birth, the outer ankle bone (fibular malleolus) sliding behind the great bone of the leg, (tibia.) These accidents sometimes give rise to the commencement of club-feet, but in many cases the ankle joint, properly so called, is very little disturbed, and the chief amount of change takes place by the twisting and overturning of the bone of the heel, and a revolution among the bones forming the articulation which runs across the instep. In most cases, the outer edge of the foot tends to rest on the ground; the instep looks outwards and the sole inward, while the toes are drawn upward; and, in many instances, their backs may be laid, by the hand of the nurse, straight up along the leg! Sometimes, but very rarely, the deformity is in the opposite direction, and the foot rests upon its inner edge. Again, not unfrequently, the heel is drawn forcibly upward, and the toes pointed downward so that the patient walks on the latter, and the former can never approach the ground.

Now as scarcely any two cases agree in the nature and extent of the deformity, which frequently extends even to the knee and hip joints, it follows that the forces required to restore the bones to their places must be almost as various in direction as the cases are in number; hence it would be folly to place the treatment in unprofessional hands; but as nearly every case is curable if taken in time, it would be criminal to suffer the deformity to be neglected, even during the first months of infancy, when surgical advice is accessible.

#### SECTION IV.

#### *Of Fractures.*

Our remarks on fractures must necessarily be general; for in a small portion only of these accidents can an unprofessional person safely undertake the treatment, even in the absence of a surgeon; yet, as there are many ways in which such assistants may be useful in promoting the welfare of the patient when no surgeon can be obtained, some little history of fractures, and a few special directions for the management of such accidents, are deemed proper in this place.

It is a very popular prejudice that much depends, in fractures, upon the first setting of the bones; and it is not uncom-

mon when one practitioner has wound himself into the care of a case belonging originally to some younger but better informed surgeon; (a dishonourable trick which we have seen more than once performed in country practice by those who, like a certain venerable friend of ours, have founded forty years of lucrative practice on no better diploma than an old title deed of land, written in Latin, and on parchment in olden times;) it is not uncommon, we say, under such circumstances, for the empiric to charge deformity arising from his own want of skill to the careless setting of the regular practitioner at the commencement. Now be it known that extreme accuracy of the first, ay! and the second, and third settings of a fracture, (for most cases require many re-settings,) is a matter of comparatively little importance! In fractures near a joint, indeed, great care and accuracy may be required at the very first; for the swelling produced by the accident is very apt to destroy all after-chance of action until too late: but these cases form a very small minority among fractures, nine-tenths of which probably occur somewhere near the middle of a long bone.

Let us not be misunderstood—It is of the utmost importance, in fractures of the extremities, that we should bring the limb to its full length as soon as possible after the accident, and keep it so; for every hour of overlapping between the fragments permits of a more and more obstinate contraction of the muscles, which always struggle to shorten the limb, and oppose the correct setting. The overlapping, if permitted to continue for some days, produces changes in all the surrounding parts, preparatory to effecting a union of the fragments in their false position; and when those fragments are afterwards drawn nearer to their proper place, these changes are rendered useless, and new ones are demanded. Now the cure of a fracture is always a serious tax on the powers of the system, and this needless additional taxation of these powers endangers the production of a weak bond of union, or a false joint. But if the limb be of a full length, a little sliding of a fragment to the right or left, or even a considerable angular deformity at the seat of fracture, is of scarce any importance until after the expiration of two weeks. The whole of this period is occupied by nature in swelling and developing the periosteum for many inches above and below the fracture, by distending its cells with effused fluids, to permit its little vessels to expand freely and carry red blood; in filling the cells of the surrounding cellular tissue and expanding its vessels in the same manner; in absorbing the medullary matter from the ends of the fragments, the colouring matter from the coagula formed by the accident; and in forming little canals through the latter, to permit of the growth of cellular tissue

to act on their interior. After all this is done, say from the end of the second to the middle of the third week, the blood vessels begin to fill the cells of all this mass of prepared tissue, first with a substance resembling cartilage, and then with bony matter. It now becomes truly important to set the limb with accuracy, and to keep it perfectly motionless until firmly united. In about five or six weeks in young, healthy, and sanguine patients, and in from nine to twelve, in old, phlegmatic, or intemperate people, a broken bone will be found firmly united by new bone thrown massively and irregularly around the fragments; but for several months longer, this new bone is capable of being re-absorbed, so as to allow the limb to become deformed by use, if the patient be attacked with severe erysipelas of the limb, or a typhus or other low fever, or if he indulge in a series of complete drunken fits. This fact is mentioned to shield the reputation of surgeons whose patients have found their limbs crooked some weeks after the attendant has pronounced them well; and also, to caution drunkards; to induce patients attacked with erysipelas within six weeks after recovering from a fracture of a lower extremity, to retire immediately to bed; and to persuade these, and fever patients, not to rise on becoming convalescent, without calling for an examination of the state of the limb. The perfect and final union of a fracture requires from one to two years; and when it is accomplished, all the unnecessary parts of the rude mass which formed the first bond of union will be found to have been removed by the absorbents.

The description of the progress of union which has just been given, is adapted to the history of cases occurring in adults. In children, the stages are always much more rapid.

We shall now proceed to give some very short directions for the management of particular fractures occurring on the road, at sea, on distant plantations, or in other situations where surgical assistance is unattainable for many days. These directions are merely temporary, and are designed to procure the patient as much freedom from pain, and security from deformity, as can be obtained by simple contrivances every where at hand, and applied by persons without surgical knowledge.

These plans, though many of them are vastly inferior to those employed by surgeons, are yet sufficient to prevent much evil; and, in many cases, they may even effect very tolerable cures.

*Fracture of the Clavicle.*—A fracture of the clavicle or collar bone, permits the shoulder to approach the side. As this change will relax the muscles which support the shoulder, it



is allowed to fall an inch or two, and as the base of the shoulder blade cannot retreat far, the arm is rolled forward upon the breast. The indications of cure are, to keep the shoulder far enough from the side, and on a level with its fellow. To effect this, take a block of the lightest dry white pine or cedar, and trim it into a wedge, four inches broad, one and a half thick at its upper part, tapering nearly to an edge below, and long enough to reach from the arm-pit to within two inches of the prominence of the elbow joint. This block should have all its edges and corners smoothly rounded, and should then be thickly wrapped up in linen or muslin, the whole being suspended on two very broad tapes, or pieces of bandage, secured near the middle of the narrow sides of the wedge. Now make a kind of stall or short sling for the elbow, of brown hollands, or other firm tissue. Let this rise about three inches behind the elbow, and run about four inches along the fore arm, when bent at right angles with the arm. Two wide bandages, each about three quarters of a yard long, are to be firmly sewed; one to the back part of the sling on the side next the body, a little above the point of the sling which receives the elbow; the other, in front, to the edge of the sling which corresponds with the outer side of the elbow joint. To apply the apparatus, proceed as follows: Seat the patient on a stool, or chair, without a back. Let an intelligent assistant raise the arm of the injured side directly outwards from the body, till it is nearly horizontal; and, placing one hand under the arm, a few inches below the axilla, let him raise the shoulder considerably above its usual level, when standing at ease. The operator now places the thick end of the covered wedge as high as possible in the arm-pit, with its slope running perpendicularly down the side.

The tapes which support the wedge are then carried up, the one before, and the other behind the chest, to the sound shoulder, where they are carefully tied over a strong compress of linen or muslin, which protects the skin from creases. The arm is now brought down to the side, over the middle of the wedge, which presses the shoulder outward. The sling being now fitted on to the elbow, and a little cotton, fine tow, or flax being interposed, the bandages are secured tightly over the opposite shoulder, in the same manner as those of the wedge. This supports the shoulder at the required height. To render all secure, fold a soft long towel, in the direction of its breadth, till it is six or eight inches wide; pass it firmly and evenly round the chest, over the lower part of the arm, and all the dressings; stitch or pin it tight in front, and secure its upper edge to the edges of the wedge cover, and to each of the sling-bands. The hand may be supported in a common handker-

chief sling, but should not be brought close round in front of the chest, or the circulation in the arm will be arrested.

This rude treatment will not prevent all such deformity as might be important to the appearance of a young girl; but it will secure a safe, strong, and not unsightly cure in a man who is not particularly fastidious about good looks, or when placed beyond the reach of surgical aid.

*Fractures of the shoulder blade.* These are rare, but sometimes occur in heavy falls and in partial inhumation under fallen banks. The unprofessional practitioner can do very little for their relief. Their existence may be known either by the irregularity of the fragments of the bone as the finger traces their outlines beneath the skin, or by a grating of the fragment upon each other, when different parts of the bone are pressed upon by the palm of the hand. If surgical aid cannot be obtained, it is proper to bind the arm lightly to the side, and leave the case to nature. In some cases the patient will recover without loss of power or appearance; in others, there will remain considerable deformity, and serious limitation of some of the motions of the arm.

*Fractures about the shoulder joint.* Accidents of this character are numerous, often very obscure, and require the highest surgical skill for their treatment. When, unfortunately, it is impossible to obtain such aid, we can do no other than secure the arm at rest in the easiest position; but the use of the limb, to a very serious extent, will generally be lost.

*Fractures of the arm.* These are known by an angularity or unnatural flexibility of the bone, somewhere between the elbow and shoulder, and by the grating of the fragments when the arm is moved. In the absence of a surgeon, much good may be done by the following plan, when pursued by an intelligent person accustomed to bandaging. Make a flat compress of linen or muslin simply folded, three inches wide, half an inch thick, and long enough to reach from the arm-pit to near the point of the elbow;—secure this to the side by two short bandages, stitched to its edges and tied over the opposite shoulder, and steady it by a turn or two of a broad bandage round the chest and compress, allowing the latter to incline a very little forward as it descends. Then, with a penknife, prepare three narrow strips of thin, well planed cedar shingle, each from an inch to an inch and a half wide. Make one of them long enough to pass from the back of the shoulder joint to the tip of the elbow, along the back of the arm; one, to extend from the outside or point of the shoulder to within an inch of the external prominence of the elbow; and the third, from the front of the ball of the shoulder to just above the bend of the elbow. Let each of these pieces be well lined with tow, on

the side next the arm, and enveloped in muslin. Now let the operator take a muslin or red flannel bandage, of about two and a half fingers' breadth, and eight or ten yards long, and beginning at the base of the fingers, envelop the whole limb evenly and smoothly to the elbow. Then,—giving the hand to an assistant, with directions to hold the forearm at right angles to the arm, while he presses the elbow strongly and steadily downward, so as to stretch the broken bone to its full length,—the operator, still holding the remains of the roller, sees that the bone of the arm is rendered straight. He next continues the bandage evenly up to the shoulder; and, applying the three covered splints in their proper position, he places them in charge of another assistant, while he brings the bandage down again, so as to surround splints, arm, and all, to near the elbow. The arm is now brought to the side, lying smoothly along the compress, and the whole is secured to the chest by several turns of broad bandage passed round the body and limb. The forearm is supported in a common sling.

Of course, no person altogether unaccustomed to applying rollers, and making what are called *reverted turns*, can undertake this treatment; but a few lessons under a surgeon gives a useful degree of knowledge of this art, and all who are at the head of establishments ought to acquire it, though we are sorry to confess that medical graduates of universities do not very generally obtain it, till they have practised for some years as surgeons. Sea captains acquire it by looking on at hospitals; and we have seen some very decent cures of fractured arms performed by such novices at sea.

*Fractures of the elbow joint.*—None of these can be successfully treated by a domestic practitioner; but when a surgeon cannot be obtained for several days, the use of the limb may be lost or preserved by the choice of an attitude; and a word on this subject is necessary. When the tip of the elbow, (the piece which projects behind the joint,) is broken off, it is immediately drawn up behind the arm, where it forms a hard lump some little distance above the joint; while the finger will sink into the cavity of the joint behind, in a manner wholly unnatural. It is absolutely necessary that, in this case, the elbow should be kept constantly and fully extended even before the surgeon is obtained. Let a long piece of thin white pine or cedar, two inches and a half in width, and well rounded at the edge, be so cut as to extend from near the shoulder to the wrist; line it well with tow, bound on with a bandage or piece of muslin, and padded thickly at the middle and the extreme lower end, to fill the inequalities of the limb. Bind this gently along the whole length of the front of the arm and forearm, so as to render the elbow immoveable; and so let it continue till the surgeon arrives.

In all fractures of the elbow joint in which the tip retains its integrity, the arm should be carried quietly in a sling until assistance can be obtained. If left, by necessity, to nature, these cases almost always result in the loss of much of the motion of the joint.

*Fractures of the forearm.*—Whether one or both the bones of the forearm be broken, the treatment may be the same. The accident is known by an unusual deformity somewhere between the elbow and wrist; (which deformity is slight when but one bone is broken high up in the fleshy part of the limb;) by the inability of the patient to turn the hand; and by the pain and grating occasioned when the examiner attempts to turn it for him.

To treat a fracture of the forearm, take two splints cut from a planed cedar shingle; one of them, long enough to reach from the bend of the elbow, when the arm is flexed at right angles, to the tip of the middle finger and a little beyond it; the other, extending along the back of the forearm, from the elbow joint to the wrist joint. Let the part of the long splint which covers the palm of the hand, be as wide as the palm exclusive of the thumb. Trim off the sides of the splint a little at the wrist, so as to render it not a great deal wider than the small part of the arm. From the wrist towards the elbow, it should gradually increase a little in width, and should correspond exactly in form with the short splint. These splints are to be covered with tow on the side next the limb; and from near the wrist to near the elbow, the tow is to be thickly padded along the middle of the splint, but more slightly toward the edges. The tow is to be securely bound to the splints by bandages. A roller of two and a half fingers' breadth, and five yards long, being provided, every thing is ready. The operator requests an assistant to stand behind the patient's arm, and clasp his hand in front of the limb, just above the elbow. He then grasps the hand; and, while the assistant gives the necessary resistance, he stretches the forearm, while at right angles with the arm, and places it in a position as natural as possible, with the palm of the hand looking upward and a little inward. He then applies the long splint, and bandages the hand flat upon the broad part, but leaves the thumb free. Having reached the wrist with the bandage, he applies the short splint also; and, continuing the roller over both splints to the elbow, he secures the bandage, and orders the forearm to be carried in a common sling. From five to six weeks is about the time required for the use of splints, in fractures of the upper extremities.

*Fractures of the lower extremities.*—The precautions in undressing and lifting the patient, laid down in the sub-section on



contusions of the perineum and fractures of the pelvis, (p. 220) are in great degree necessary in cases of fracture of the thigh. There is no difficulty, it is true, in getting off the upper garments; but the boots or shoes, the stockings, and one limb of the pantaloons must be sacrificed at once, rather than that much pain or rough motion of the fractured limb should be produced. A hand-barrow, or a plain broad board carried on cross-sticks, by four or six men, is a much better mode of conveyance for such accidents, than the settee so commonly employed. As in injuries of the pelvis, so in those of the inferior extremities, the undressing of the patient should be completed before he is placed on his bed. In all fractures requiring to be treated in the recumbent position, a mattress is preferable to a feather bed. During the lifting of the patient into the barrow, or into the bed, one individual should retain exclusive charge of the injured limb.

*Fractures of the thigh.*—It is not to be expected that the domestic practitioner will be able to effect a cure of fractured thigh, without considerable deformity; but as such accidents will occur, where no other assistance can be procured, it is well to state a rude method by which the usefulness of the limb, at least, may be secured. Let a mattress be selected, and let it be placed on a strong bedstead with a light sacking or a wooden floor. Place the patient comfortably upon his back on this. Now procure a soft roller towel, and, if possible, two large pieces of buckskin. Place the largest piece of buckskin carefully over the perineum, and between the scrotum and thigh upon the injured side. Place the middle of the towel, smoothly folded until about three inches broad, directly between the folds of the buckskin on the perineum; and, sliding one end of the towel behind the corresponding buttock, while the other is brought up in front of the pelvis, bring both ends near the arm-pit on the injured side. Now take a stout piece of window cord or clothes line, and securing one end to the two loops of the towel near the arm-pit, carry the other behind the shoulder and up to the head of the bed, where it must be very firmly secured to the head board, or the upper cross piece of the bedstead, in such a manner as to lie evenly along the surface of the bed. This fixes the upper part of the patient's thigh.

Next, let a stout block of inch white or yellow pine be nailed to the bottom cross-piece of the bedstead, opposite the foot of the injured limb, and let it be long enough to reach an inch or two below the cross-piece, and so far above it as to be level with the middle of the hollow of the foot, as the heel lies upon the mattress. The upper end of this block is lightly notched, like a swallow's tail.

The operator now folds a silk pocket handkerchief, diagonally, until it is about two and a half inches wide in the middle. The centre of this, should be applied to the back of the ankle, the two tails brought forward and crossed on the top of the instep, and then carried downward on each side of the foot to about five inches below the sole, where they are tied firmly in a hard knot. The unexpended ends of the handkerchief are then secured to a piece of stout cord, one or two feet long. The operator is now ready for setting the limb, which he does by grasping the ankle with both hands, and stretching the limb firmly, slowly, and regularly, until it appears nearly, or quite of the full length. An assistant passes the little cord attached to the handkerchief over the notch in the foot-block, and, by tightening it from time to time, secures all that the operator gains. When the extension has been carried as far as desirable, the cord is tied round the projecting bottom of the block, and the operator proceeds to support the foot by pillows at the sides, or some other contrivance to prevent the toes from turning the broken limb outward by their weight. To prevent the bed-clothes from touching the limb, he takes three keg-hoops, cuts them in half, and, making a double semicircular arch of each, by tying the corresponding halves together, crosswise, he places these two domes athwart the limb, beneath the clothing. The limb should be measured frequently from the front point of the shin-bone to the point of the outer ankle; and whenever the limb is found retracted, the extension should be renewed, and the cord tightened. It is best to place the second piece of buckskin between the handkerchief and the foot, to prevent ulceration, which is apt to occur during extension, which must continue five weeks.

*Fractures of the Leg.*—Little can be done towards setting a fractured leg, by any but the best surgical anatomists, when there is much displacement among the fragments; but, fortunately, in a great number of cases, there is very little displacement. The treatment is then very simple, and the domestic practitioner may imitate the surgeon very closely.

Take a planed inch board, long enough to reach from six inches above the knee to three inches below the heel. Make it ten inches wide at the top, and seven at the bottom. On the bottom, nail a foot-piece, standing up at right angles, or inclined a very little downward by a bevel. Let this foot-piece be five inches wide, by ten inches high, with a semicircular top. Now make two lateral splints, as long as the back-board already described, and let them be six inches wide at the bottom, eight inches wide at the top, and one inch thick. Along one margin of each of these lateral splints, and along both margins of

the bottom board, bore four spike gimlet holes, at equal distances. With eight pieces of stout tape, tie the lateral splints to the bottom board, so as to allow them to move as on hinges, (which latter are, of course, preferable, when obtainable,) and we have a very decent fracture box for broken legs. To employ the apparatus, lay a soft, thin feather pillow on the box, with the lateral splints expanded, and over this, if you have one, a cloth of oiled silk or India rubber. Then, the limb having been previously extended, the foot brought into a natural position, and all great irregularity in the line of the shin bone removed, the operator carefully lifts the limb with his two hands, while an assistant passes the fracture-box and pillow beneath it. The leg being laid carefully on the pillow, after it has been a little hollowed out at the heel and calf, the lateral splints are turned up, and three or four broad tapes, doubled, being passed under the whole fracture box, are tied at one side, so as to produce moderate pressure on the leg. The limb is then covered with bran thrown down on the pillow, and the dressing is complete. This bran is used directly, without other dressings, when the limb is slightly excoriated, or has received small wounds at the time of the accident. It usually crusts with the blood and fluids over such places, which get well rapidly beneath; but, if suppuration come on, it washes off most kindly with Castile soap and warm water, and is renewed in a moment. Bran is even the best application over the strips and salves used in large wounds; and also over the poultices, in bad compound fractures. It absorbs the escaping fluids, preserves cleanliness, and excludes the fly. We have seen it applied directly, with the happiest effect, to the surface of the worst lacerated gun-shot wounds.

*Fractures of the Fingers and Toes.*—When these parts are crushed by weights, poultices as well as splints are generally necessary; but, whether in simple or complicated fractures of the hand, it is best to bind the whole hand to a splint adapted to the form of the edges of the palm and fingers, excluding the thumb, and extended as high as the muscular part of the forearm, to check the motion of the wrist. When the thumb is broken, we use a little splint, which covers the ball of the thumb, and, becoming rapidly narrower as it approaches the first joint, extends to the end of the last joint, so as to prevent flexion. It is bound on by a very narrow strip of bandage, which, after enveloping the thumb, makes two or three turns round the wrist, and is finally secured by a pin over the ball of the thumb.

The toes are very rarely subject to simple fractures. When such accidents occur, we treat them by means of a splint to

the sole of the foot, with suitable compresses and bandage, prohibiting the foot from being put to the ground for at least four weeks.

*Fractures of the lower Jaw.*—The uninitiated can do nothing with these troublesome accidents, except to support the chin by a handkerchief tied over the head, securing it by another passed round the temples, and feeding the patient entirely on broths and gruels till a surgeon can be obtained.

Before quitting entirely the subject of fractures, a few general remarks must be made. The diet of a patient with fracture, for the first week, should be low; but there can be no greater mistake than the continuance of low diet for a longer period, without urgent necessity. The labour of uniting a broken bone, when once commenced, is a severe one; and nature requires the support of a generous diet, from the end of the first to that of the sixth week. A pretty free use of good porter or ale, during this period, is not at all amiss, when there exist no constitutional objections to it. A neglect of this rule we believe to be the most common cause of imperfect unions and false joints, especially in the public alms-houses of the country, and in those of some cities, where public charity is placed on an *exceedingly economical footing*.

An adult patient, who has had a fracture of the inferior extremities, may relinquish his splints in five or six weeks, and may be subjected to frictions and passive motions of the limb to remove stiffness; but he should not be permitted to rise, without the permission of a surgeon, till the completion of eight weeks. A boy of twelve years may throw off his splints a week earlier, and may rise in six weeks.

An adult who has had a fracture of a superior extremity, may throw the apparatus aside in five weeks, and a boy of twelve years in four. The former may apply the limb to light uses in six, and the latter in five weeks.

The long confinement on the back, in fractures of the lower extremities, render it necessary to guard against ulcerations of the back and buttocks from constant pressure, in weakly people. By changing the point of support with down or air pillows, this terrible evil, when threatened, may be prevented. Even when surgeons are in attendance, it is safest for the friends to look after this matter occasionally, especially in females. The use of the bed-pan, an absolute necessity when common beds are used, is often extremely annoying and painful. Beds which remove this difficulty by very simple machinery, have been invented by Drs. B. H. Coates, and Caspar Wistar. They are in use in hospitals, and the wealthy at a distance may be put in the way of obtaining them to order by



addressing Mr. Samuel Sheppard, druggist, South Ninth Street, Philadelphia. I believe that they are no where kept on sale.

*Of Dislocations in general.* When the extremity of a bone is thrown out of the cavity which is intended to contain it, it is said to be dislocated, or put out. This accident, when sudden, is always attended with a laceration of some of the ligaments, and a severe stretching of others. Portions of the edges of the bony cavity of the joint are often torn off by the ligaments. Some of the muscles attached to the dislocated bone are relaxed, and others are violently elongated. If the bone remain out of place for any length of time, the relaxed muscles contract and hold it almost immoveably in its new position. The torn ligaments soon unite with surrounding parts, so that in old dislocations they must be re-torn before the bone can be replaced. After some weeks or months, the cavity of the old joint begins to be filled up with bone and cartilage, while its edges are absorbed and rounded off. In the mean time, the distorted muscles become slowly accustomed to their new positions; their functions are partly restored; and nature commences the formation of a rude new joint, by throwing out an irregular cup of new bone round the displaced head. These changes show the necessity of promptitude in reducing dislocations as speedily as possible; for every hour of delay rapidly increases the resistance: they also expose the absurdity of those pretenders, called bone-setters, who profess to restore dislocations of several years' standing; or, in other words, undertake to restore the bone to a cavity which has long ceased to exist! But the gullibility of the public is without end; and the only reward of the professional man who ventures to denounce the ignorance of these empirics, *whose blunders swell his receipts*, is the pitiful charge of sinister purpose and selfishness! The deaths and miseries occasioned by these pretenders are buried in oblivion, while the few apparently brilliant successes, "*where many of the best surgeons have failed*," are bruited about with all manner of exaggeration. Yet it must be confessed there is reason to fear that the opportunity for some of these successes, is furnished by the culpable habit of certain excellent medical practitioners, whose want of advantages and exclusive pursuits have rendered them ignorant of the first principles of surgery;—the habit of taking charge of surgical cases;—which are thus removed from the notice of those whose professional studies fit them for such undertakings. It is time that the public knew, that to be a most profound medical scholar or teacher and a most successful practitioner, though it by no means *disproves*, tends in no degree to *prove* a capacity for treating the most simple dislocations or other surgical cases.

There are, we believe, but three kinds of dislocation in which the domestic practitioner can make himself useful. Of these we will speak.

*Dislocation of the arm into the arm-pit.* When, after a fall, or blow on the shoulder, the arm is found fixed at an angle of thirty or forty degrees with the side of the body; when the patient has lost nearly all command of its motions, but when an assistant can move the elbow backward or forward a few inches, with great pain to the patient; when the elbow can be lifted directly outward from the body, without much pain, till the arm is nearly horizontal, but cannot possibly be made to approach the side, the mere attempt producing intense suffering; when the point of the shoulder stands out sharp and clearly marked, and the round muscular prominence immediately below it is flattened, so that the finger, when pressed inward immediately below the point of the shoulder, seems to sink into a kind of cavity; and when we can feel, in the arm-pit, a large, round, bony lump, which has no business there; we know that the arm is dislocated downward into the arm-pit.

If, in such a case, a surgeon cannot be procured within two hours, an intelligent assistant can, and ought, to attempt the reduction without delay; and, by following these directions, he may almost always succeed with very slight effort.

Let the patient lie flat upon his back on the floor, with his head supported by a pillow. The operator then seats himself also on the floor, close by the side of the hip of the patient, on the injured side. Extending the leg next the patient he then places the sharp outside edge of his foot between the side of the body and the bony lump formed by the head of the bone in the arm-pit. The sole of the foot looks outward, and forms an inclined plane for the head of the bone to slide over, while the instep presses the patient's side. The operator now grasps the wrist of the injured arm, and, drawing it obliquely downward, while carried as far outward from the side as the natural position of the limb after the accident shows to be necessary, he applies a long, regular, gradually increasing force, until he feels the limb begin to elongate a little. As soon as this is perceived, and while the extending force is fully maintained, he makes a gentle attempt to carry the arm toward the side. If successful, the head of the bone will suddenly fly into its place with a snap; if he fail, the extension must be continued and increased; and, after a time, the attempt to bring the arm to the side must be repeated. Success generally follows in five or ten minutes. The force required is often exceedingly slight; but it is sometimes very considerable, and it is, therefore, best that the operator should

be a rather powerful man, and capable of continuing a considerable amount of extending force for many minutes together. There are several other forms of dislocation of the arm; but none of them are manageable except by surgeons. They are rare; and we have no wish to induce rashness to meddle with such cases, by communicating a partial knowledge of the subject.

*Dislocations of the Wrist.*—These accidents occur in various directions, and may be either complete or partial. Their nature is too obvious, when they occur, to admit of any doubt even on the minds of those who know nothing of surgery; and when the best aid is not obtainable within an hour or two, it is right to attempt the reduction, which is rendered vastly more difficult after swelling and inflammation have supervened.

One law will apply to the mode of reduction, in all the varieties. Let the surgeon grasp the forearm, above the wrist, firmly, with one hand, while with the other he seizes the dislocated hand. Let him then make gradually increasing and very steady extension, in the direction in which the fingers point in each particular case, and when the hand evidently begins to yield to the extension, gradually, and without force, it may be brought into its proper position.

*Dislocation of the Ankle, with Fracture of the Fibula.*—This common accident sometimes happens from turning on the side of the foot, and sometimes from falls, blows, or pressure on the outside of the leg. It may be known by a want of firmness in the bone immediately above the external ankle, which feels as if beaten in, and by the undue ease with which the sole of the foot can be made to look outward to an improper extent. The best treatment for this accident, when a surgeon cannot be procured, is that prescribed for fractured leg, with but slight modifications. There is no difficulty, whatever, in replacing the foot; but the muscles have a constant tendency, though not a forcible one, to tilt it outward again. To check this; place the limb on the pillow, in the common fracture box described under the head of fractures of the leg; use the feathers in the pillow, or the bran, or a folded towel between the pillow and box, to make a kind of compress which shall press the outer edge of the foot inward, and turn the sole of the foot in the same direction, slightly. The part of the pillow pressing on the inner ankle should be, also, supported by a compress placed between it and the box, while the part opposite the outside of the limb, for three inches above the external ankle, should have the feathers shaken from it, so as to press as lightly as possible. This attitude being preserved until the fracture unites, will secure the ankle

joint against serious loss of power, though it will probably remain a little weakened.

Whenever a limb has been dislocated and reduced, it should be confined in a motionless position for two or three weeks, in order that the torn ligaments may re-unite; and if this be neglected, the displacement is extremely apt to recur.

We have now given all the advice we dare venture to give the uninitiated, in relation to dislocations. In all cases except those above mentioned it will be safest to let the case rest for surgical advice, however tardy, rather than to increase the danger to life or limb by awkward efforts. A perfectly simple and manageable dislocation may, by a little ignorant tampering, be rendered almost, or quite irreducible, to the infinite torture of the patient.

#### SECTION V.

##### *On Inflammation and its Consequences.*

It is so utterly impossible to lay down any course of treatment in inflammations and their consequences which will not be liable to exceptions too numerous to be specified, that it becomes most important that even the domestic practitioner should take a broad view of the subject, and possess himself of certain general principles, before he ventures to study the special directions given in this section. His general knowledge and practical good sense must often be permitted to modify even his application of those directions. I must, therefore, beg the reader who has read the preceding chapters of this work to recur, with serious attention, to the sections on the Reproduction of Parts, (p. 133,) Symptomatic Fever, (p. 138,) Irritation, or Hypernutrition, (p. 147,) and Inflammation, (p. 153,) in the Physiological chapter. This he should do before he commences the study of the present section.

*External Inflammations*, (in which, alone, with their consequences, the surgeon is interested,) whenever they are somewhat considerable or severe, yet not sufficiently violent to produce collapse of the system, present us with at least three deviations from the ordinary actions of health. The inflamed part itself,—in a state of actual disease, with its vessels weakened, and rendered incapable of resisting the force of the circulation,—contains more blood, and circulates, at first, a larger amount of this fluid than natural. The nerves of the part are



rendered painfully susceptible of all impressions by this increased supply, and even the distention of the part becomes a source of pain. The activity of some of the functions of the vessels is even increased by their development, and the animal heat is, for a time, elevated even above the height necessary for the most rapid reproduction of parts. The heat, redness, swelling, and pain are, therefore, carried beyond the standard of health. Nature takes the alarm lest this excessive condition should unfit the part for the exercise of its functions; and she immediately prepares for its destruction and replacement, should the severity of the injury render this necessary. The centre of inflammation is every where surrounded by blood vessels in the highest state of activity, agglutinating the cellular tissue with lymph, and drawing a line of circumvallation around the disease, which, even should it prove unnecessary, is still a sanative attempt. To support this activity, and to prepare for all chances, the larger arteries leading to the part become gradually dilated, and the heart begins to make additional efforts to increase the supply of blood; or, in other words, symptomatic fever is induced.

It is very probable that, when the human race was young, and the vigour of the constitution was unimpaired by luxury or vice, this process usually terminated without assistance in the best cure of which the nature of the case admitted. Among savage tribes,—none of which, however, can be considered as approximating very nearly in physiological condition to the race in its primitive state,—the history of inflammatory affections seems to lend some colour to this hypothesis.

But, *in these degenerate days*, man has become artificially modified to such an extent that the “*vis medicatrix naturæ*” itself must be ridden with curb and lash, or it will inevitably overleap all reasonable bounds.

Before speaking of the treatment, let us take a view of the several terminations of inflammation, as they are called. These are in reality but three; *Resolution*, *suppuration*, and *mortification*; but nearly all surgeons adhere to the following list; viz. *Resolution*, *effusion*, *suppuration*, *ulceration*, and *gangrene* or *mortification*.

When all the symptoms of inflammation gradually decline and disappear, naturally or under the action of remedies, leaving no signs in the part of the pre-existence of disease; it is said to terminate by *resolution*.

When, from longer continuance, the distension so far enfeebles the vessels that they become unable entirely to expel their undue contents by the natural route, they frequently transmit a portion of the more fluid parts through their coats into the sur-

rounding cellular tissue, in the form of clear or bloody serum ; and the inflammation is then said to terminate by *effusion*.

The title of termination by effusion is also given to that process by which blood vessels, irritated to a high degree of activity, secrete lymph or other matters in the interstices of the capillaries, so as to form a tumour or callosity more or less permanent ; but this result is directly connected with hyper or morbid nutrition, or with the reproductive power of nature, and is not, strictly speaking, a consequence of inflammation : it is very frequently witnessed in enlarged glands. Termination by effusion, then, is but a modification of that by resolution ; for the effused fluid, if the disease terminate at all, soon disappears by absorption, leaving no trace behind.

When the injury done to the vessels in the centre of the inflammation is so great that they are gradually unfitted for fulfilling their part in the system, and are irrecoverably altered, they begin to undergo a process of absorption to make way for the formation of new parts. A cavity is thus formed, which is always lined with a new membrane, and the new blood vessels of this membrane secrete pus or matter, which continually dilates the sac, filling up the space as fast as the inflamed and useless parts are absorbed. Thus is formed an abscess ; and as the secretion of the pus rapidly relieves the inflammation where it is mildest, it gradually subsides and is said to terminate by *suppuration*.

Inflammations of mucous surfaces, and sometimes those of the skin when divested of its cuticle, terminate by suppuration without loss of substance.

When the same condition of parts that has just been noticed, occurs immediately upon the surface, or when a very superficial abscess bursts externally before the inflammation subsides, we have an open sore instead of a cavity, and the inflammation is said to terminate by *ulceration* : but as such ulceration is uniformly attended with the secretion of pus, this obviously constitutes a mere variety of the termination by suppuration.

When the violence of the inflammation is so great as to destroy suddenly the vitality of the part, before absorption can begin to remove it, it is said to terminate by *gangrene or mortification*.

*Treatment.* The great object in the treatment of inflammation is, if possible, to bring about a resolution ; and the means are various.

1st. *All external and mechanical sources of local irritation should be removed.* When the inflammation affects the skin, the atmospheric air itself becomes a source of irritation, by increasing the vitality of the blood ; and hence, we often guard the part by covering it with flour, or cerate ; as, in ery-

sipelas; or with mucilage; as, in inflammation of the eye. Motion is a powerful mechanical irritant; hence all inflamed parts should be kept strictly at rest. Often, the pressure of the skin or a fascia acts mechanically to produce intense irritation in the inflamed parts beneath; hence we divide these bands freely by the knife; as, in laying open a whitlow, or the capsule of a swelled gland.

Sometimes the inflammation attacks delicate soft parts interlaced with rigid tendinous fibres, and we are obliged to divide the swelling in various directions, or even to destroy it totally with vegetable caustic; as we often do in carbuncle.

2nd. *Means should be used to cause the vessels to contract, and drive the blood from the part: but the means should be sedative.* Cold, and certain astringents are the remedies chiefly employed for this purpose. Cold water, ice water, water cooled by dissolving in it the muriate of ammonia, and lead water, which is a cold solution of the acetate of lead, are generally employed, and one or the other is a desirable application in almost every commencing inflammation of moderate extent. To be effective, cold must be applied constantly till the heat of the part is reduced below the natural standard. If the part cannot be immersed in the refrigerating fluid, or the latter allowed to fall in a steady stream upon it, we must use rags thoroughly wet, and very frequently changed till the effect is produced.

3rd. *Pain, which is a great source of irritation, may be occasionally checked to advantage by narcotics.* Thus we use rags wet with laudanum, even in anticipation of inflammation, in severe contusions of nervous parts; as in a mashed finger. In certain extensive inflammations, the watery solution of opium is exceedingly useful; as, in wide spread erysipelas of any other parts than the head and face. In severe injuries to ligamentous parts, occurring to feeble or delicate patients, a hop poultice has a happy effect on this principle; as, in some sprains of the ankle.

4th. *The quantity of blood in the active blood vessels around the inflamed part, should be directly and indirectly diminished.* This is done indirectly by cold applications, and directly by the employment of leeches.

5th. *The force of the heart's action, and the quantity of the general circulating fluid, should be lessened.* This is effected by a low diet, purgatives, diuretics, diaphoretics, and all measures calculated to increase the secretions in other parts; and, still more directly, when the condition of the patient will permit, by bleeding from the arm.

6th. *We may often do much good by drawing off the surplus vitality of the inflamed part by counter irritants, and the undue sup-*

*ply of blood by calling it to distant parts.* The first is often effected by issues and seatons to the back of the neck, in inflammations of the eye and ear, and the latter by dry and wet cupping, and by blisters, in deep-seated inflammations.

7th. *When the general force of circulation is sufficiently reduced, either by the debility induced by very extensive inflammations or by artificial depletion, we may give relief by causing effusion directly from the neighbourhood of the inflamed vessels.* Though this is usually effected by powerful stimulants, the relief following the subsequent effusion, more than counterbalances the temporary increase of the disease from the previous irritation. On this principle we use blisters over inflamed glands, and directly upon surfaces affected with erysipelas.

When an inflammation shows a disposition to terminate by effusion, the circumstance almost invariably marks a complete crisis in the disease; and, with some caution in keeping the force of the general circulation down to the natural standard, the case may be left pretty much to nature.

When the effusion is considerable, and does not appear disposed to yield readily to absorption after the inflammation has subsided, it is sometimes advisable to hasten its retreat by moderate pressure with a bandage, or by bathing the part with brandy, or whisky and water. This condition is frequently noticed in the skin after erysipelas.

When it is ascertained that inflammation will not terminate by resolution, but is running on to suppuration, (a condition easily known by a throbbing pain in the tumour, by the swelling beginning to approach the surface at some particular point with more rapidity than usual, and at last, by a discoloration of the skin over this point,) a change becomes necessary in the plan of treatment. It is still an object to lessen the severity of the inflammation, and the activity of the circulation around the inflamed part, in order to prevent the undue extension of the abscess; but it is also desirable to hasten the suppuration, and to bring it as soon as possible to the surface or within reach of the lancet.

To effect this, while we continue for a time the use of low diet and gentle purgatives, we apply a warm bread and milk poultice, changed twice a day, to the centre of the inflammation; and as soon as we can perceive a fluctuation, or the motion of a wave of matter when tapping the sides or top of the tumour with the tips of the two fore-fingers, we plunge in a lancet and evacuate the matter. The local treatment is then regulated precisely as that for uniting wounds by the second intention.

When the abscess is very large, and the discharge profuse, or when the patient has been greatly debilitated by other causes,



there is a great tendency to sink; and the strength must be supported by a generous and highly nutritious diet, sometimes with the addition of porter or wine, the use of bitter tonics, and the mineral acids; such as ten drops of the elixir of vitriol, (*aromatic sulphuric acid*,) three drops of nitric or muriatic acid, or five drops of the muriated tincture of iron, to be taken twice or thrice a day, in half a tumblerful, or more, of water. Soaking the feet every night in the nitro-muriatic bath, (see Index,) is often extremely serviceable. This singular remedy frequently produces a salivation, but without shock to the constitution, or that danger of taking cold which attends mercurial pyalism.

When inflammation terminates, or endeavours to terminate in ulceration, the ulcer may be found in either of four conditions, dependent on the state of the surrounding parts:—and here we exclude the varicose ulcer, which has been treated of elsewhere.—In one condition, the inflammation subsides entirely as soon as the ulcer has reached its greatest dimensions under the action of the bread and milk poultice, which is used here, as in the abscess, to promote the rapidity of the necessary changes. The case is then analogous to a simple wound with loss of substance, and will recover under similar treatment. This is what most surgeons have termed *healthy ulcer*. It is formed by disease, and is then not healthy: it becomes healthy when the inflammation ceases, and is then, properly speaking, no longer an ulcer.

In another condition, not distinguished by any particular name among surgeons, the inflammation, instead of succeeding in effecting a termination when the ulcer appears, seems to propagate itself all around, from the ulcer as a centre; the latter enlarging continually, as the inflammation destroys the fitness of the neighbouring parts to fulfil their functions. The *burrowing and phagedenic ulcers* of surgeons belong to this class: sometimes the inflammation travels superficially, and the parts beneath the destructive operation retaining their healthy powers, the ulcer may heal from the centre, even while it enlarges round the circumference; as we see in *Rupia* and other affections of the skin, some of a scrofulous, and others of a syphilitic character. This condition marks the absence, or the imperfection of the process by which the reproductive power of the system endeavours to arrest the progress of inflammation; and it clearly indicates a bad state of the general health. It is found that, when extensive and rapid, these ulcerations require, for their cure, absolute rest of the whole person, moderate, but not too strict diet, and regular purgation; a few grains of calomel being occasionally added to the saline or other cathartics employed.

The mineral acids, as prescribed in excessive suppurations, are also highly serviceable. Locally, the application of cold seems to be interdicted, and the simple bread and milk poultice proves inefficient. I have found a poultice composed one half of the crumb of bread, and the other of coarsely broken leaves of cicuta, (*conium maculatum*;) prepared with milk in the usual way, the most powerful of all local measures in the treatment of the burrowing and phagedenic ulcers. Notwithstanding the rapid advance of the habit of treating syphilis without mercury, I still invariably endeavour to produce and maintain a slight copper taste in the mouth, by means of pills of one grain of calomel, in every case of rapid and deep ulceration, apparently of syphilitic origin. Cases that resist every thing till this impression is produced, will often get well immediately after, under the use of cicuta. In rupia and some other similar exulcerations of the skin, the pure extract of cicuta, made into an ointment with a very little lard, will often effect great relief; but proper rupia is a most unmanageable affection. Calomel given to touch the mouth is inadmissible in these cutaneous cases; but calomel in the form of an ointment, applied directly to the sore, is often useful. We might dilate upon the thousand remedies which occasionally cure slight, and ill-defined ulcerations of the skin; but the extreme difficulty of distinguishing the very numerous varieties of these affections, must for ever keep them within the province of a select circle of professional men, who pay particular attention to diseases of the skin.

In a third condition, the parts around the ulcer are relieved of the activity of inflammation; but the blood vessels, instead of returning to a healthy state, seem to undergo some unknown change of action, which keeps up an excessive excitability of the nerves of the part. The ulcer is extremely painful; sometimes constantly, and sometimes periodically; and its edge is irregular or jagged. The granulations often form with great rapidity, and nearly fill the sore; when suddenly, and without apparent cause, they totally disappear, leaving the sore as bad as ever. The discharge is seldom of pure pus, but more generally an irritating and thin ichor. These ulcers occur most frequently in the neighbourhood of moveable joints, and particularly in that of the ankle: they are the *irritable ulcers* of surgical writers. The most absolute rest of the neighbouring joints, and of the part affected, must be secured; and, if necessary, this must be done by splints of carved wood, moulded tin, or wet book-binders' board, bound on the limb, and allowed to dry there. The ulcer must be dressed with narcotic poultices, of which the best are those prepared with bread and milk mingled with cicuta, (*conium maculatum*;) Jamestown

weed, (*datura stramonium*,) and opium; and, in some cases, the poultice of boiled hops and vinegar will prove serviceable. The dressings must be light, for the part will not tolerate much pressure; and as no one article agrees with it for many days together, the poultices may be alternated with each other, and with plasters of simple cerate, or of this ointment mixed with about one-eighth of its bulk of sugar of lead. Surgeons sometimes relieve the most obstinate of these ulcers, by burning off the whole surface with vegetable caustic, (*caustic potass*,) and dressing with the bread and milk poultice, until the slough is separated. The new sore thus created sometimes resembles a healthy wound, and heals without difficulty.

In the fourth and last condition, the edges of the ulcer are thick and rounded; the whole sore is surrounded by a callosity, which appears to embarrass the restorative powers; although the absorbents had failed in removing all the parts which are rendered incapable of performing their proper duties by the inflammation, and had saddled them, weak as they are, with a task of reproduction, of which they are incapable. The discharge is sometimes purulent, sometimes watery, and sometimes almost imperceptible. At one time, there will be no visible granulations; at another, the sore will be filled with such as are large, rounded, pale, and flabby; instead of small, conical, bright red, and firm. In some cases, on the contrary, the bottom of the ulcer is covered with small, pale granulations of very slow growth, and almost cartilaginous hardness. The cavity is generally deep, and the edges overhanging.—Such ulcers are most common on the lower extremities, and are the *indolent ulcers* of surgical writers.

These ulcers require the employment of pressure, to promote the absorption of the callosities or deposits which surround them, and assist in rendering them indolent. Pressure is best applied by means of long and broad strips of adhesive plaster, drawn tightly across the sore, and supported by a well applied bandage and compress. They should be changed or tightened, once every other day, at farthest; and if any tendency to erysipelas appear on the neighbouring skin, the strips must be omitted, and the bandage and compress relied upon solely. Poultices, or any other moist applications, continued for many days together, are very injurious; and the local applications require to be stimulating. Among the best ointments may be mentioned, basilicon ointment, Goulard's cerate, red precipitate ointment, white precipitate ointment, and tar ointment. These must be changed from time to time; for no one application will continue to do good for many days consecutively. Great cleanliness should be observed, and the

part should be well washed with Castile soap, water and sponge, before each dressing. Sometimes the ulcer will not tolerate unctuous applications of any kind, but shows a disposition to become irritable under their use. Mucilaginous or astringent washes must then be substituted. Of these, some of the best are, decoction of slippery-elm bark, decoction of oak bark, and solutions of the sulphates of iron or copper in the proportion of fifteen or twenty grains to the ounce of water.

When the bottom of the ulcer is entirely without granulations, perhaps little can be gained by any additional stimulation; but when filled with such as are loose and flabby, if the astringent washes do not alter their character, it is best to dust them every two or three days with red mercurial precipitate, or with a little burnt alum. This last article is a very mild caustic, when applied to new-formed parts, and a powerful astringent under all circumstances. It is prepared by placing a lump of common alum on an iron shovel, and placing it over the fire. It melts in its own water of crystallization, and the heat must be continued until this water boils off; and the remaining mass, finely powdered, is the burnt alum used by surgeons. When the sore contains the little, pale, cartilaginous granulations above mentioned, some still more powerful applications are required; and the best of these is the mild mineral caustic, (lunar caustic or nitrate of silver) which may be freely applied to the whole surface, and repeated, if necessary, several days in succession. Surgeons sometimes resort to still more powerful measures, and cut away the thickened edges with the knife, or burn them off, together with the bottom of the ulcer, by means of the strong vegetable caustic. Ulceration in general is a modification of the termination of inflammation by suppuration.

When an ulcer of any class has been regularly filled by granulations, these sometimes become exuberant instead of healing over; and they then rise into what is called *proud flesh*. This must be repressed by the free application of Peruvian bark, burnt alum or lunar caustic, according to the obstinacy of the growth; but in using the two last named articles, care must be taken to prevent their touching any part which has not risen above the natural height of the surface, or any part upon which the thin, white, or glossy membrane which forms new skin, has begun to appear.

Instead of the thin membrane which marks the proper process of healing, we sometimes observe the surface partly covered with a thicker, opaque, white, spongy looking film, which often separates in flakes, from time to time, and shows no disposition to dry. Whenever this is the case, the ulcer



should be covered with the dry dust of chalk, or, what is better, the carbonate of zinc, over which we may lay a simple rag of muslin.

Indolent ulcers, with a surface constantly moistened by a fluid thinner than pus, but which are not painful, will often recover under a constant covering of the dust of chalk, or under a dressing of simple dry lint; and I have known some of the most obstinate to be happily changed in their condition by being left uncovered, and entirely exposed to the stimulant and drying effects of air for twenty-four hours together. When an ulcer shows a disposition to form a scab, this should never be disturbed unless pus collect beneath, or unless the hardness and contraction of the scab prove very irritating to the surrounding parts. In either of these cases it may be separated by one or two bread and milk poultices.

Though inflammation is said to terminate in gangrene or mortification, the mortification often precedes the inflammation. This is the case in the malignant pustule, the gangrene of old men, and the dry gangrene from eating bread which contains spurred rye or ergot.

*The malignant pustule* is a rare disease; but is beginning to appear in this country. It is contracted in the strangest manner, by carving or opening the bodies of diseased cattle! It begins by a small spot of mortification, occurring somewhere on the extremities, (generally the upper,) without pain or warning. It spreads very rapidly, and soon becomes encircled with a ring of horribly painful inflammation. But one remedy is known for it, and it will certainly prove fatal if this remedy be not applied very promptly. The whole pustule with the inflamed ring around it must be entirely destroyed with vegetable caustic, or the white hot iron; and the part should then be dressed with bread and milk poultice until the eschar comes away; after which it is treated as a simple ulcer.

*The gangrene of old men* begins almost invariably in the toes, advances up the leg, and involves the whole thickness of the member. It is supposed to be caused by the ossification of the smaller arteries. Life may be supported till assistance is obtained, by generous diet, keeping the bowels free, and moderately administering wines and cordials. Amputation is the only remedy: but this cannot be attempted until the progress of the disease is arrested, and nature attempts a separation. Even then; the large arteries are closed by coagula, for some inches beyond the mortification; so that the operation must be performed high up; and the chance of success is very slight, both on account of the debility of the patient, and the frequency with which the ossification is found extended to all the smaller vessels of the limb, or, perhaps, the whole body.

The rare and curious disease, called *dry gangrene*, occurs in persons of all ages. It begins at the fingers or toes of one or more limbs, affects the whole thickness of the member, and is progressive. The part dies and shrivels, without producing much smell. The principal blood vessels are closed far above the termination of the gangrene. Amputation is necessary, with the same precautions as in the last named disease; and the chance of success is very slight, for nearly similar reasons.

*Gangrene from excess of inflammation occasioned by internal and constitutional causes*, may extend to the whole thickness of a member, or be comparatively superficial. In the former case, amputation will be necessary; in the latter, it can seldom be required. This form of gangrene is progressive; and the vessels are closed beyond its limits. Amputation is, therefore, liable to the restrictions and risks mentioned in speaking of the gangrene of old persons, and the dry gangrene; but in this form, when the line of demarkation between the living and the dead parts is once clearly marked, the chances of success are vastly greater, unless the patient be reduced by disease to an extreme degree of feebleness.

In the treatment of the form of gangrene under consideration, independently of the proper remedies for the relief of the general disease which causes the inflammation, and in addition to the usual measures for maintaining the strength of the patient and keeping the secretions in good condition, as laid down under the head of suppuration, we have local measures for arresting the progress of the gangrene, which are of little avail in the preceding varieties. The most powerful of these is a blister, applied all around the line where the mortification terminates. This practice was strongly inculcated by the late celebrated Dr. Physick. Its action obviously results from the relief given to the capillaries in the immediate neighbourhood of the gangrene, by the effusion caused by the blister.

A great variety of poultices have been recommended in the treatment of gangrene; and some of them, such as the fermenting and charcoal poultices, have been regarded as almost specific in their action by many. But, excepting that it is proper to apply gentle stimulants to the weakened vessels immediately in contact with the dead matter, and that it is agreeable to check the fetid odour of the decaying parts as much as possible, there appears no very valid reason for modifying a poultice merely on account of the neighbourhood of dead matter. The charcoal poultices are dirty, and the fermenting ones are troublesome and very disagreeable. We would therefore recommend, in domestic practice, a simple bread and milk poultice, when the extent of the disease is small, and a poultice of Indian meal and water, dusted over with powdered

Peruvian bark, when it is great. If the cinchona be not procurable, prepare the poultice with a decoction of tanner's bark, or the bark of the dog-wood,\* (*cornus florida* or *ceracea*.) To remove the terrible fætor, the dead part of the limb may be wrapped in cloths wet with pyroligneous acid, and surrounded with coarsely powdered fresh charcoal, these applications being frequently renewed.

The probability of recovery in cases not requiring amputation, depends very much upon the strength of the patient, and his ability to bear the exhaustion of a terrible discharge during the whole time of the separation of the dead matter and the healing of the cavity left by its decadency. To increase the chances, the tonic measures and diet directed in case of profuse suppurations from abscesses should be carried as far as the general condition of the patient will warrant.

*Gangrene from pressure*, that dreadful affliction of the bed-ridden, is progressive only so far as the cause is progressive; and its extension ceases the moment that the pressure is removed. There is no reason to believe that the blood vessels are clogged with coagula for any distance beyond the margin of the gangrene. The usual seats of this kind of gangrene are the sacrum, the nates, the hips, the backs and points of the shoulders, and—in mismanaged fractures of the leg or thigh—the parts over the tendon of the heel, that tendon itself, and the perineum. The preventive treatment consists in varying frequently the points of pressure, (except in cases of fracture, where the pressure must be smoothly applied, and made moderate in degree,) by means of down cushions, air pillows, changes of position, and, in hospitals, air and hydrostatic beds. Fomentations with cold brandy, or whisky, tend to fortify the part; and, after gangrene has occurred, they hasten the separation of the sloughs. The best poultice, in such cases, is one of plain bread and milk; or, if the general debility be very great, a little bark may be added.

*Gangrene from Cold*.—This is seen principally in the ears, nose, lips, chin, and extremities. It affects the whole thickness of the part attacked, and generally requires amputation, to prevent the irregular cicatrix resulting from a natural separation of the parts. It is very rarely progressive, and is never so to any great extent. There is no reason for believing that the circulation in the vessels is embarrassed far beyond the limit of mortification. The line of demarkation between the

\* We mean the tree called dog-wood in the middle states. The name is a dangerous one, for it is applied very differently in different places; and we are told that it is used at the north to signify the most poisonous of the sumacs, the *rhys vernix*!

dead and living parts is readily, and, in most instances, speedily formed. In these cases amputation is, therefore, beset with none of those dangers which attend it in most of the preceding varieties. The prospect of cure, under the proper general treatment, is good; for the patients most subject to these accidents are men of vigorous and hardy constitutions. We have known of more than one instance of natural cure, without amputation, after the loss of both feet, where professional aid could not be obtained, and where even the diet was ill adapted to support the patient under an exhausting discharge of pus.

*Gangrene from Mechanical Injuries.*—When the mortification occurs from the excess of inflammation produced by mechanical injuries, the injuries are generally much more extensive than the mortification; and for this reason alone, the gangrene is frequently progressive. The uniform ill effects of amputation in some of the preceding varieties, has induced many surgeons to proscribe the attempt to amputate before a clear line of demarkation is traced, by the absorbents, between the dead and living matter; or, at all events, before the progress of the mortification is arrested. Hundreds of lives have been sacrificed to the exhaustion and sympathetic mischief resulting from severe injuries, during the delay occasioned by this ill-founded opinion. We cannot allow even this opportunity to pass without stepping aside, for a moment, from our legitimate track, to point out some proofs of the erroneous character of the rule to those practitioners whose position removes them from the opportunity of widely extended surgical observation.

Traumatic gangrene, (the technical title of the present variety,) though frequently progressive, never extends, when uncomplicated, beyond the parts seriously injured at the time of the accident. The embarrassment of the circulation from coagulation never appears over a sphere much more extended than the limits of the injury. The principal causes of mortification, or ulceration of the stump, and consequent death, after amputation in other forms of gangrene, are either the vitiation of the constitution by previous disease, or the morbid condition of the part involved in the operation produced by similar causes. Now, in traumatic gangrene, the constitution is usually sound, until the health is undermined by the consequences of the injury itself; and, especially, by the irritation produced by the morbid condition of the parts; which are so altered by the accident and the subsequent inflammation, as to be liable to fall under the progress of the gangrene. So much for the dangers dependent on the general condition of the health. As it regards the state of the part operated upon, no surgeon in a sound state of mind, professionally speaking, would attempt to pass his knife through parts seriously altered from



health. He goes above the injury; or, at least, above the severe impression which it has made; and there operates upon parts nearly, or entirely, in a sane condition. The causes of disaster, in amputations during the progress of other gangrenes, are therefore absent in the commencement of traumatic gangrene; and we are confident that the risks of an ulceration or mortification of the stump, as well as the danger of phlebitis, or metastatic abscesses,—the usual causes of death,—are much greater when we wait for the line of demarkation, than when we operate as soon as possible after the full establishment of reaction.

Cases occurring in persons previously affected with serious ill health, are of course exceptions to this law, and one other caution seems advisable here. A livid appearance of the skin, and the formation of collections of bloody serum beneath the cuticle, after bad fractures and contusions, are no proof of gangrene; for we frequently see this state of things on the surface of limbs, in which the signs of circulation beyond the injury are plain and obvious. These cases often recover without another unpleasant symptom.

In traumatic gangrene so situated as not to require or admit of amputation, the treatment should be similar to that prescribed in gangrene from excess of inflammation produced by internal causes.

*Terminations of inflammation coupled with collapse.*—Having completed our remarks upon the terminations of inflammations of moderate extent, it is time to add a few words upon those which are so general as to produce collapse. The most frequent of these accidents are such as result from burns and scalds, which may therefore be taken as the type; though there are others of similar character occasioned by causes both internal and external.

The condition of things immediately following an accident of this description, is widely different from that pictured at the commencement of this section. The very extent and number of vessels injured, renders it impossible that the rapidity of circulation should be materially increased in the part; for the whole mass of circulating fluid is insufficient to keep up a swift current through so many dilated vessels, while furnishing a sufficient supply to the other organs, and the body generally. This impossibility is rendered more positive by a natural consequence of all extremely severe or extensive injuries; one which has been already described in the chapter on physiology. This is the concentration of the vital energies upon the organs most essential to life, which produces a fulness or engorgement of the blood vessels of the brain, lungs, stomach, and the portal system generally; thus removing a vast mass of blood from

other parts of the body, oppressing and checking the action of the heart, and leaving the surface, where uninjured, pale and contracted.

In this condition, the inflamed part is indeed reddened, but the colour is not the florid hue of lesser inflammations, but wears a purple, dark, or venous aspect. The temperature is not materially increased, and is often found even below the natural standard; for the main source of animal heat is cut off. For the same reason,—the tardiness of circulation,—the sensibility of the superficial nerves is diminished, instead of being increased. But little positive pain is felt, and although there is sometimes a terrible burning or tingling sensation, yet, in a vast majority of cases, the patient complains of nothing but cold, and trembles like one in the chill of an ague. It is curious that the extent of a superficial injury is much more effective in producing collapse than its severity. I have seen many of the muscles of both legs destroyed by hot sand poured out from a bursted brick kiln, yet the patient suffered no collapse, and lived for many weeks; and again, I have seen a man who had been completely surrounded by high pressure steam, immediately on its escape, in profound collapse and violent chill, though the scald had not raised a blister on any part of his person.\* An individual but slightly burned over more than half his surface, almost always dies; while one who has been most severely burned over but one-third of his person, stands a fairer chance of recovery!

In the state above described, it is evident that the application of cold would be extremely improper. It diminishes still farther, the already deficient vitality of the surface, and increases the determination of blood to the centres of life already oppressed with their load. We have seen a surgeon wild enough to direct cold effusions on one of the most extensive burns attended with collapse; but almost immediate death disproved the correctness of the doctor's theory! Equally idle, to use no harsher term, would be the attempt to employ local depletion, or low diet, in cases of this character. In very bad accidents of this nature, the labour of reparation, if attempted, keeps the system constantly depressed. The reaction is imperfect, and when fever occurs, it is of a low type, and attended with great danger of inflammation of internal organs.

The general treatment throughout the case must be of the tonic and stimulating character, to support the patient's strength, and equalise the circulation; care being taken to

\* It is a remarkable fact that steam, on its first escape from very high pressure, does not scald. The farther the subject is removed from the orifice, the more serious is the effect of the heat.

keep up the natural secretions by suitable purgatives, such as eight or ten grains of rhubarb, occasionally combined with five of calomel, and the terebinthinic mixture given in the dose of a table-spoonful every three or four hours. The stimulants given should be of a nature to act on the skin. The camphor julep and wine whey, are among the best. If there be great restlessness and vigilance, an occasional dose of a tea-spoonful of Hoffman's anodyne, will give great relief.

Acidity of stomach may be checked by ten grains of carbonate of soda, dissolved in a wine-glassful of water. Sickness of stomach may be relieved by the spice plaster, with cold mint tea, or the horse-mint tea, (*monarda punctata*;) and thirst by lemonade, cremor tartar water, and ice. When suppuration is extensively established, great benefit frequently follows the use of the decoction and tincture of bark, or the best wine bitters.

The local treatment must also be stimulating. The application universally employed, in the first instance, in very extensive burns and scalds, is the Kentish ointment; a mixture of lard and spirit of turpentine; which, far from giving pain, is peculiarly soothing in its effects.

The above directions are intended for the treatment of cases in which free reaction never becomes established. When the pulse rises, and the swelling, heat, and pain of the part increase, the proper treatment should be cautiously and slowly approximated to that prescribed in inflammations of more moderate extent.

These injuries very rarely terminate in resolution; and then, only in cases of the mildest character. When the mischief is more severe, the cuticle is lost over part, or the whole of the burned or scalded surface, and the most troublesome ulcerations of the true skin are almost sure to follow. When still more severe, the true skin itself is destroyed, often together with deeper seated parts. We have then, actual and instantaneous mortification, preceding the inflammation; but the gangrene never shows a disposition to spread—it is strictly local. The ulcers are now proportionally more unmanageable, and are followed by terrible contractions of the cicatrices when healed, often producing dreadful deformities, and sometimes destroying the use of the neighbouring joints. These deformities are not always incurable—surgery has many resources for their relief, in the way of serious, painful, and protracted operations; but very few surgeons in this country have as yet been willing to attempt much in this way. The subject, however, attracts more and more attention daily.

Having completed our somewhat ample remarks on Inflammation, in general, we must trust mainly to the intelligence

of the reader, in applying the principles and directions to particular cases. Our remarks on certain peculiar inflammatory affections will be few, brief, and confined chiefly to those points in which the nature or treatment of the disease differs from that laid down in the preceding portion of this section.

*Of the Sty.* This is an inflammation on the edge of the eye-lid, surrounded by much hardening, and often inducing inflammation of the front membrane or conjunctiva of the eye, and consequent intolerance of light. Sties are often very tedious and painful, and there is apt to be a succession of them.

The sty is occasioned by a clogging of the outlet of one of the little glands, which furnishes cheesy or gummy matter to the edge of the eyelid. The secretion then collects and forms a little sac, which inflames, but rarely if ever suppurates freely. Sometimes it may be much benefited by the application of a leech or two, after which the eyelid may be rubbed with Goulard's cerate; and if the interior of the eye be inflamed, it should be relieved by frequently dropping into it a single drop of a solution of the pith of sassafras, made by shaking four or five inches of pretty thick pith, or a proportionate quantity of that which is finer, in a four or six ounce vial full of pure water. To drop this, let the patient place his fore finger over the mouth of the vial, and looking directly up to the ceiling, let him bring the edge of the vial close to his open eye: by raising his finger a little from the mouth, and then closing it again immediately, in this position, a single drop will fall directly on the ball of the eye. When there is any disposition to point, or form a yellow spot on the edge of the eyelid, it should be picked open with the point of a needle, and the yellow crust which soon forms on the spot, should be kept soft by very frequently washing the gently closed eyelids with warm water and plenty of Indian meal. A disposition to form a succession of sties may often be checked by wetting the palm of the hand with brandy or whisky, and subjecting the open eye, every day, to the fumes alone, by holding the wet hand over it.

*Ulceration of the eye-lashes.* There is a troublesome scurfy or scaly ulceration of the edge of the lid which destroys the eye-lashes, after surrounding the base of each hair with a kind of honey-comb crust.

To relieve this, prick away all the scabs carefully with the point of a needle; and then with the back of the point of a penknife, spread a little citron ointment, mixed with its own bulk of lard, over the ulcerated surface, pushing it very carefully between the hairs, but avoiding all contact between the eye and the salve. In half an hour, wash it off with Castile



soapsuds on a soft rag—and repeat the application every morning.

*Foreign substances in the Eye.* Particles of dust, saw dust, sand, the grit from grindstones, &c., are very frequently caught between the eye-ball and lids, where they give intense pain, and if not immediately washed out by the flood of tears which they create, they produce excessive and sudden inflammation. They must be removed as soon as possible. If of a dark colour, and above a microscopic size, they may always be seen by raising the upper or depressing the lower lid, drawing it off at the same time from the ball by means of the lashes, and directing the eye to be rolled in various directions. After a few trials, we almost always see the offensive particles, and can readily remove them, either by blowing with the breath, or scooping them up with the eye of a silver probe or bodkin, or one handle of a delicate pair of ladies' scissors. The eye bears the contact of these smooth solid substances perfectly well; and if gently used, they give no pain whatever. As soon as the particle is removed, a drop of the solution of pith of sassafras should be dropped into the eye, and it should be covered with a handkerchief for a few hours. When the mote cannot be perceived, a good sized eye-stone may be slipped between the upper lid and the ball, and the lids closed. The stone will immediately commence travelling round the eye, pushing the mote from place to place before it, till the latter approaches the opening, and is washed out by the tears. The stone may be left in the eye for an hour; as it produces no unpleasant sensation. Every family should be provided with several of these useful little messengers, which are sold by the apothecaries. They are the opercula or mouth-pieces of small marine shells, worn very smooth by the waves, and collected on the beach in certain countries. They should be kept very clean, and preserved from the contact of all acids; for even vinegar or lemon juice will dissolve and spoil them. Their motion in the eye is occasioned by that of the ball and lids. If they do not drop out the moment the eye is opened, they may be pressed out by a slight touch of the fore-finger.

Sometimes pieces of iron, so minute as to be scarcely visible, are driven forcibly into the membranes, or even into the cavities of the eye. In the latter case, if the eye be not evacuated in consequence of the size of the wound, the iron is absorbed by the fluids, generally without producing material inconvenience; but when the particles stick in the outer membranes, they give intolerable pain. The worst accidents of this kind happen to turners, machinists, and blacksmiths: they always require the aid of a surgeon. Fortunately, surgical aid

is almost always promptly attainable in the neighbourhood of the establishments of these artisans.

But I have frequently seen milder cases in distant country situations, where domestic relief is often the only dependence for many hours. On attempting to work rusty and neglected iron pump-handles, the axles of grind-stones, and the chains of well-buckets, we frequently see thick showers of fine sharp particles of rust shot off in all directions with great force by the friction. This is the general cause of the accident on distant farms, and it is very rarely understood. When, after standing near either of the domestic machines just mentioned, while in action, a patient suddenly complains of great pain in the eye, an inability to keep it open, and a profuse flow of tears, we should at once examine the organ with extreme care; and if a minute speck of a black or brown colour is seen in the clear or white part of the eye, which does not move upon being gently touched with the point of the finger, we are sure of our case. A person with firm nerves, a steady hand, and a tolerably delicate touch, may safely pick away the mote with the point of a long needle, provided it be not obviously sunk beneath the surface. In this case, he must use freely the solution of pith of sassafras, and leave the treatment to a surgeon, be his arrival late or early; for, by attempting too much, the eye might be evacuated.

As soon as the point of the needle has obviously removed any portion of the mote, the operator may be assured that the whole is dislodged, even though a brown or dark spot remain. Motes of this kind are hard, and do not come away piece-meal; and they always produce an appearance which may prove a source of dangerous error, if the fact be overlooked. They communicate to the tissues all around them a stain of their own colour, which often continues for weeks after the cause is removed. The consequences of attempting to pick away this stain need not be pointed out.

*Inflammation of the Eye.* The human eye is an organ so extremely complex, that it is subject to a very great variety of diseases, some of them destructive to the organ itself, and others even to the life of the patient. It is, therefore, with fear and trembling that we attempt to address ourselves to unprofessional ears upon this critical subject. But after having seen the eye filled with powdered alum, when in a high state of inflammation,—with sand, to grind off a film mechanically,—with spirits of turpentine, to relieve a burn, &c., we cannot but feel that the few remarks we are conscientiously warranted in making, may be productive of more good than harm.

Acute inflammations of the eye, when at all severe, are commonly attended with violent reaction. The fever is gene-

rally open and high, and the case requires the most vigorous general, as well as local treatment.

The lancet should be freely used when the constitution of the patient will bear it, and in those terrible inflammations of hot and sandy countries, sometimes, though rarely witnessed in other situations, which produce suppuration in the course of a few hours, it is often advantageous to bleed, even to fainting. The diet should be as strict as possible, and both eyes should be positively protected from light. Saline purgatives should be given freely and frequently, as the patient's strength will bear it.

When the iris is inflamed, the state of the organ may be known by the formation of a well defined, narrow red ring round the circumference of the clear part of the eye; (a redness evidently shining from deeper parts, through the white membrane in that place, where it is thin;) by a reddish, dusky, or unnaturally mottled appearance of the coloured membrane of the eye; by an unusual smallness, immobility, and, sometimes, irregularity of the pupil; by pain deep-seated in the ball of the eye, often very intense; and by a sensation of constriction and pain across the front of the forehead, above the eye-brows. In this state of things, the mouth must be touched with mercury, as rapidly as possible, by giving a pill of half a grain of calomel and the fourth of a grain of opium, four or six times a day, while the general treatment above described is pushed with vigour; omitting all purgatives, for fear of retarding the action of the mercury. The moment the gums appear a little sore, and the quantity of saliva begins to be increased, the mercury must be intermitted; and, if the salivation threaten to run high, a gargle of borax and sage tea, and a purge of sulphur and cremor tartar should be given. The operation should be followed by the occasional exhibition of a mercurial pill whenever the salivation appears likely to cease; so as to keep up a gentle action on the mouth for several days. This is almost the only hope of safety in iritis.

In inflammations of the front membrane of the eye, which are much more common, the whole surface of the inside of the lids and the white part of the ball are generally reddened. The lids are swelled and puffy, the eye watery, and the edges of the lids, in mild cases, are generally agglutinated in the morning. There is intolerance of light, but not so marked as it is in iritis. The pain is commonly superficial, and is of the smarting and burning kind. The general treatment being carried on as vigorously as the violence and rapidity of the case seem to require, the best local measures are the use of the infusion of the pith of sassafras and weak lead water. Cold applied to the lids gives great relief.

In bad and rapid cases, the swelling becomes very great; the external membrane of the eye becomes thickened and granulated, rising up until the clear part looks as if seated at the bottom of a blood-red cup, and the thickened membrane sometimes actually protrudes from the lids. In this condition the eye pours out an enormous quantity of pus. If the disease continues unchecked, the external lining of the clear part becomes cloudy and opaque, or even red. This produces a film which seldom disappears entirely, and often produces incurable blindness. These cases occur, occasionally, in all places, and at all ages; but they are most frequent among children in temperate, and adults in tropical climates.

In addition to the general treatment already laid down, the author of these pages introduced into the practice of the Pennsylvania Hospital, in 1819, a plan of local treatment, formidable in appearance, but perfectly safe, even in popular hands, under the circumstances described, and one which has never failed, in his hands, to conquer the disease. It consists in applying three or four American leeches directly to the ball of each affected eye, avoiding the clear part. When the leeches are two-thirds full, cut off a quarter, or half an inch of their tails with a very sharp knife, razor, or pair of scizzors, disturbing them as little as possible by the operation. They will then continue to suck for a long time, evacuating themselves as fast as they fill. If their pertinacity exceed the bounds of patience, they may be made to fall off quickly by touching their backs with a little dry table salt. This operation never produces any evil consequence, though the unpractised operator is often extremely alarmed, next day, to find the whole surface of the eye of one bright red hue, in which no vessels can be discovered! This appearance is occasioned by an effusion of blood from the leech bites, poured out beneath the membrane, which is nearly transparent, even when inflamed. It is of no consequence whatever, and disappears in a few days by absorption, sometimes passing through the various shades of colour usually seen in bruises. After the operation, the eye should be covered with a light, cold bread and milk poultice, containing a little sugar of lead. This practice, with the exception of the mutilation of the leech, has been since introduced, extensively practised, and publicly advocated by a distinguished surgeon of Dublin. To show the safety of the leech, as an application to the ball of the eye under such unfavourable circumstances that none but a surgeon could safely presume to employ it, I will mention that in one case of violent iritis threatening the destruction of both eyes long before salivation could be induced, I ventured, as a forlorn hope, to apply three very large leeches directly to the red



ring already described, where they bit entirely through the white coat of the eye, and drew the blood directly from the vessels supplying the iris. Strange to say; though the pupils were contracted to the size of the heads of large pins, and nearly square, while the iris wore all the appearances of impending disorganization; the relief of the attack, under this treatment, proved both immediate and complete.

*Ulceration of the Cornea.*—This affection is noticed chiefly to warn the domestic adviser to seek surgical advice as quickly as it appears. In this affection, the eye is very intolerant of light, and watery; and, on examination, we perceive, on some part of the clear portion of the eye, a small, rounded, or irregular depression; and two or three well marked red vessels are seen meandering from some point of the white of the eye across the field of the clear part, toward this depression. The danger of loss of sight is imminent; and, although surgeons possess many resources for the successful treatment of the case, yet all that can safely be done by unprofessional friends, is, to relieve pain by the use of the solution of pith of sassafras, or well filtered watery solution of opium; to exclude all light; and, by practising, in moderation, the means of general depletion laid down at the head of this article, to delay the progress of the case until aid can be obtained.

*Films on the Eye.*—The disease called pterygium by surgeons is very common, and only occasionally gives trouble. It then appears as a triangular opaque membrane, supplied with many long red vessels, with its sharp point slowly creeping on to the clear part of the eye, generally from the inner side, and crowned with a little brown lump at its angle. Its growth is not inflammatory; but it frequently becomes inflamed with cold. Astringent washes, such as sulphate of copper, three grains; sulphate of zinc, four grains; or acetate of lead, six grains to the ounce of water, will sometimes cause it to shrink and disappear, for a time; but, if they give uneasiness to the eye, they must be omitted. When this affection encroaches permanently upon the sight, we perform, for its relief, certain surgical operations, neither painful nor dangerous; but troublesome, and of rather doubtful success.

Opacity of the cornea, or clear part of the eye, and those films which arise from purulent ophthalmia, are not always entirely beyond the reach of surgery; but time itself often does much in those cases which are not utterly hopeless; and we seriously recommend the reader not to endeavour to hasten the change by art, unless by the advice of the really skilful: but, by all means, let him shun the absurdities of vulgar quackery, and the false pretences of itinerant oculists: with these, what little sight remains, is almost sure to be lost.

Nearly all the chronic affections of the eye, including rheumatic and scrofulous inflammation, will endure to wait until the best advice can be obtained: the deeper seated inflammations are beyond any popular assistance, except such as may result from the rational application of the general principles laid down in the commencement of this section, and we have now said quite as much of diseases of the eye as we can say conscientiously in a work designed for families.

*Foreign bodies in the Ear.* Insects occasionally make their way into the external ear, particularly in children, when lying on the grass. They sometimes produce horrible torture by irritating the drum of the ear, and parents are troubled to know how to dislodge them. No process is more simple.—Let the child recline with the opposite ear upon a pillow, and fill the affected one with sweet oil. There is no insect that will not perish, or make good its retreat, when this method is pursued.

Solid substances are frequently pushed into the ear by children; where, if large, they sometimes occasion much inflammation, and become firmly wedged by the swelling. Great danger of destruction to the drum and small bones of the ear, results from awkward attempts at removing such substances, by which they are driven still deeper into the canal. If the foreign body have any visible projecting point, of which a firm hold can be taken, this may be seized by forceps or pin-cers, and the body removed directly; but when the substance is rounded, or formed with many faces, or extremely smooth and cylindrical, it is very wrong even to attempt its removal by any such means. Cherry stones, apple seeds, common beads, garnets, bugle beads, and pieces of red coral, furnish many cases in point. If we attempt to seize them in front, they instantly slip farther in, and endanger the drum. We must get behind them and hook them out, always proceeding with great caution. Sudden and severe pain warns us when we touch the drum of the ear, and then all considerable pressure in the inward direction must cease. When the foreign body is small in proportion to the size of the canal, it may generally be removed by means of the little steel ear-picker on the handle of the common pocket tweezers; but, when larger, the eye of a fine bodkin or silver probe should be gently curved and inserted beyond the body to draw it forward. A few drops of sweet oil, previously dropped into the ear, will much facilitate the operation. When a large glass bead, with eighteen or more polished faces, is forced into the ear,—an accident which we have seen rendered fatal to hearing by mismanagement,—the only sure mode of extraction is to pass a very fine hook through the eye of the bead, and

catch a purchase upon its farther end. A fine darning needle, with its temper entirely destroyed by the candle, and curved at a right angle as closely as possible to the extremity of the eye, furnishes the best extemporaneous instrument for such extraction.

*Ear-ache and suppurations of the Ear.* The diseases of the ear are intricate and little known, and it would be idle to dilate on them here; but a few words may prove useful in alleviating pain.

There are media of nervous communication between the teeth and the ear, through the distribution of the fifth pair of nerves. When, therefore, we find a settled, obstinate pain in the ear, either constant or irregularly paroxysmal, without obvious cause, without much detriment to hearing, or any swelling or purulent discharges, we should examine the condition of the teeth and gums, and remove all sources of irritation in that quarter.

Swellings and suppurations of the lining membrane of the ear generally result from cold. They may be either internal or external to the drum; but, in either case, the severe throbbing pain is best relieved by warmth; and one of the best modes of applying warmth is as follows:—Take a root of the garden garlic, and roast it pretty thoroughly; then separate the cloves; and after syringing or washing the ear with Castile soap, or milk and water, made pretty warm, heat one of the cloves, and taking a little piece of silk string, with a large knot on one extremity and a needle at the other; pass the thread through the clove, from the great toward the small end, and draw the knot just within the surface: then introduce the clove into the ear, large end foremost, and as warm as it can well be borne, leaving the end of the string dependent. Change this application every few hours, syringing the ear, if necessary.

Frequently in children, and sometimes in adults, ulcerations occur in the external ear, and these may even occasion diseases of the bone, pieces of which are often discharged from the sores; and sometimes the affection has been known to prove fatal by reaching the brain. The discharges in these cases are fetid, and the disease is an indication of constitutional ill health. All that can be done by the domestic practitioner, is to keep the ear as clean as possible, by syringing; to relieve pain by the garlic cloves, when violent inflammations occur; and to attend to the condition of the bowels and general health. Free air, and tolerably good diet, are generally required, when there is no threatening of disease of the brain.

*Ulcerations of the Mouth.* There are several forms of

small ulcerations of the mouth which give great inconvenience, but rarely lead to a consultation with a physician, except in large cities, or in cases of more serious disease in which these ulcers appear merely as a symptom. They are seen on the edges of the tongue, the gums, and the inside of the lips or cheek. They are small, irregular, superficial, often numerous, very painful, sometimes surrounded with many enlarged vessels and a small ring of bright red hue. Their surface is covered with a closely adherent white coat or spurious membrane. Some of these are herpetic, others are aphthous. They often prove obstinate, because they are caused by a bad condition of the bowels.

They may be seen, occasionally, at all the other mucous orifices of the body, and even on the brown areola round the female nipple.

The favourite applications to these ulcers, are borax, and salt-petre applied solid or in solution; but the treatment which we have found most generally successful, is the saturated solution of sulphate of copper. The sore should not be left under the impression of this agent for more than five minutes, when the mouth should be well rinsed with cold water. The application should be repeated every day or two. It frequently happens that these sores, when situated on the cheeks or lips, are rendered much more painful by their pressure upon the teeth, or by the irritating effect of impurities about the gums. This may be at once relieved by roasting a fig, splitting it in half, and applying the soft side of one piece next the sore.

*Gum-biles.* The causes and nature of these affections are too well known to need description. They are sometimes very large, and tend to break externally. They should be brought forward as fast as possible by means of the hot fig poultice just described; and if large, should be opened early by the lancet, always on the inside of the mouth; for, if they burst or are punctured externally, extremely disagreeable deformity always results. As soon as they recover, any decayed fangs which may be likely to reproduce them should be extracted; but it is generally unadvisable to perform such operations during the continuance of the inflammation.

*Suppurations of the urinary passages.* Besides the discharges of matter from the male and female urinary passages, originating in immoral habits, there are others equally profuse, which are occasioned by cold, chemical irritations, poisons taken internally, and other causes. We have seen them several times, in carefully guarded girls under ten years of age, and in boys even before the age of five years. It is, therefore, incumbent upon the medical or domestic practitioner to



be extremely guarded in founding suspicions of moral impropriety upon such slender grounds.

Whatever be the cause of the discharge, the symptoms and proper treatment are nearly the same. There is a period, lasting from three days to two weeks, during which inflammation runs very high, with extreme scalding in urination, and often intense pain, particularly at night. On the subsidence of these violent symptoms, the discharge of pus often becomes even more profuse, though the scalding and pain may have been almost relieved. After several weeks or months, if the case be neglected, the discharge changes gradually to a pale, and almost colourless, glairy fluid, nearly incapable of cure, and exceedingly exhausting to the patient.

During the highly inflammatory stage, the general treatment of severe inflammation, which has been already described, should be employed, and local injections used after every urination. The best injections are made of the pith of sassafras for males, and the slippery elm bark for females. If great pain be suffered at night, apply a large bread and milk poultice, with opium, or one of hops and vinegar, well diluted with water. From thirty to sixty drops of sweet spirits of nitre, in half a wine-glassful of water at bed-time, is often very soothing. When the inflammation has, in some degree subsided, a little rose water may be added to the injection; and when the pain and scalding are very considerably diminished, we may begin to use an injection of sulphate of copper in the proportion of half a grain to the ounce of the solution of the pith of sassafras. This injection produces much smarting, and, at first, an increase of the purulent discharge, soon followed by a decided diminution. The strength of the injection may be increased every three days, at the rate of half a grain of the sulphate to the ounce, until the discharge be checked, or the strength be five grains to the ounce, which must not be exceeded. The arrest of the discharge is sometimes effected by the first injection, and in other cases, not for several weeks. A sudden arrest by too powerful a solution at first, may occasion very serious consequences; such as swelled testicle in the male and peritoneal inflammation in the female; but, with the single caution to omit the astringent injection for a few days, if the inflammation be found decidedly increased by it an hour after the application, the practice above described will be found perfectly safe, if strictly followed. Once, or, at most, twice a day, we may use the sulphate of copper; but the plain mucilaginous injections may be employed as often as they are found agreeable. Some persons are very fond of the stimulating balsams, internally exhibited; but we have seldom seen much benefit derived from them.

*Excoriations about the mucous orifices, occasioning swellings of the neighbouring glands.* All the mucous orifices of the body are liable to two forms of superficial ulcer or excoriation: one beginning with a little watery blister, which bursts and leaves a shallow sore, soon acquiring a hardened base; and the other commencing generally with a very small pustule, and covering itself with a soft scab. Both forms are very apt to occasion swellings of the neighbouring glands, which, if neglected, will sometimes suppurate, when they must be opened and treated as abscesses; but this termination must be prevented, if possible. The ulcers should be washed every morning with a saturated solution of sulphate of copper, to be removed by clear water, without friction, in about five minutes; and after the part has been dried, it should be covered with the powder of carbonate of zinc, renewed as often as it becomes moistened by the discharge. When the ulcers begin to contract, the sulphate of copper may be omitted; but should they spread or multiply again, it should be renewed.

When the glands begin to swell, the patient should be put on a low diet, and bled, if necessary. He should also take a gentle saline purgative daily; such as the Seidlitz powders. If the glands swell rapidly, let leeches be freely applied over them. If still unchecked, and no signs of threatened suppuration appear, apply a blister over them. When the hardness of the glands continues long after the ulcerations which caused their enlargement are cured, a plaster composed of ointment of white precipitate, one ounce—camphor in fine powder, one drachm—and muriate of ammonia powdered, one scruple—will very much promote their absorption.

*Chafing in the creases of the folds of the groin and other parts.* To this very troublesome affection, fat persons and children are peculiarly subject. It is a transformation of skin into mucous membrane, from the exclusion of air and the constant action of moisture, and is at once cured by keeping the part covered with dry pearl powder or carbonate of zinc, washed off and renewed twice a day with cold water. The powder allows the air to penetrate the fold, and keeps the part dry; thus restoring the skin to its natural structure.

*Chafing from friction.* This source of annoyance is too well understood to need description. It is best relieved by coating the part well with sweet oil, or unsalted lard, and then allowing cold water to flow over it. The interposition of a little lint or a piece of silk between the parts subject to attrition, will prevent the renewal of the evil.

*Of Abscesses.* For the general principles which regulate the treatment of abscesses, we refer to the pages on inflam-

mation terminating in suppuration. Our present intention is to offer a very few remarks on opening and dressing these affections.

When an inflammatory tumour has commenced the formation of pus, the occurrence is known by a change in the character of the pain, which becomes throbbing and comparatively dull; (we must except from this rule inflammations of the hand and foot, which generally throb from the first;) by the summit of the tumour assuming an unusual prominence, and a faint attempt at a conical form; by a perceptible decrease of hardness in the centre; and, after a time, by the fluctuation of the pus when the swelling is tapped with the finger.

The disposition to point or open externally is known by a decidedly conical prominence, and by a change in the colour of the skin, from white, to red or brown. It is rarely proper to allow abscesses to open of their own accord; for nature almost always effects the purpose awkwardly and imperfectly. The thumb lancet is the instrument commonly employed in opening them; but in timid patients, where the matter approaches very near the surface, and the parts are painful, the spring lancet is sometimes preferable. In very large abscesses, containing quarts of matter,—especially when they occur in patients much debilitated by the disease,—it is often safest to evacuate the contents at several different times, allowing the punctures to heal in the intervals. This is done by passing the thumb lancet very obliquely through the true skin, before raising its heel and plunging perpendicularly into the cavity; so that the internal and external orifices do not correspond, and the skin is used as a valve to be closed when the desired amount of matter has escaped. The sudden evacuation of the whole of these large collections sometimes causes the patient to sink; and the admission of air into the cavity changes the pus afterwards secreted, rendering it irritating, and bringing on a dangerous inflammation of the extensive sore. But, in all abscesses of moderate extent, the puncture should be direct, and the evacuation as complete as possible. As soon as it is completed, a small portion of lint should be gently inserted into the orifice to prevent it from closing by the first intention, and then bread and milk poultices should be applied for one or two days. The lint comes away with the first dressing, and need not be renewed. If there be much inflammation about the abscess, the poultices may be continued; but if not, it is commonly best to apply some plain ointment, such as the simple cerate, to the orifice of the cavity, while we use a bandage, with or without moderate compresses, so as to keep the sides of the abscess as much in con-

tact as possible, without interrupting the free exit of the pus as it is formed.

In large abscesses, it is sometimes convenient to surround the dressings with bran to absorb the pus, and keep off the fly.

Large collections of matter sometimes form without obvious inflammation at the spot where they appear. These are most frequently seen on the back or thigh, or about the anus. They must never be tampered with by the domestic practitioner, as both their cause and place of commencement are generally beyond his cognizance, and the attempt to open them often hastens the death of the patient. They may be connected with disease of the spine or liver, though pointing on the shoulder or thigh!

*Run-round.* This is a disease of the fingers and toes. We frequently see an inflammation running round the sides and base of a nail, commonly caused by paring too closely the fold of the cuticle found in that situation, or by tearing down a shaving of the edge of the nail. The inflammation produces a ring or semicircle of redness, and a very considerable degree of swelling, attended with extreme soreness and considerable pain. Suppuration speedily supervenes, and the pus is located between the external cuticle and the duplicature of that membrane which is reflected inward toward the root of the nail. It is easily evacuated by raising the skin from the nail, or dividing the edge of the fold, where the matter shows itself plainly through the cuticle. It is well to apply a poultice for two or three days to a run-round of this kind, but it should then be omitted. All the loose cuticle should be carefully pared off with a delicate pair of scissors, and the surface will then be found moist, covered with an imperfect cuticle, and studded with minute ulcerations. If the old cuticle be suffered to remain, the soreness will be very protracted; but, when removed, if it do not yield in a few days to the use of simple cerate, it may be cured by dusting it with dry carbonate of zinc.

*Whitlow.* This is a much more formidable and terribly painful disease of the fingers and toes. It sometimes occurs without obvious cause, and is apt to attack several digits in succession. It may be brought on by a bruise, by pricking with a needle, by biting or cutting the nails to the quick. The inflammation may be seated either immediately beneath the thick, hard skin of the last joint, beneath the firm, tendinous fascia, or beneath the periosteum of the same part. These three positions constitute three varieties of whitlow; the severity of the symptoms, and the seriousness of the case, being propor-



tionate to the depth of the seat of the disease. The pain, in all the cases, is very great, and also the febrile reaction. The patient is generally deprived of all sleep until the suppuration has made some advance. In the deeper varieties, the pain is but slightly if at all assuaged by the suppuration until the matter is evacuated.

It is vain to attempt to cure a whitlow by resolution; and the local treatment should be such as to promote the formation of pus as quickly as possible, by means of warm bread and milk poultice, with which a little laudanum may be mixed by way of trying if it will give any relief to the pain, though, in most cases, it increases it. The general treatment should be active. Purges of Epsom salts, the lancet, strict low diet and repose, should be positively insisted upon. The only remedy which we have ever known to procure sleep during the height of the attack, is tartar emetic or the antimonial wine, given in sufficient dose at bed time to produce decided nausea without vomiting. To effect this, give the patient twenty drops of antimonial wine every ten or fifteen minutes, till the requisite nausea is produced.

The moment there is reason to believe that matter has formed, we relieve the patient at once by a very painful, but highly necessary proceeding, to which no patient who knows the instantaneous relief which follows, will, for a moment, object. With a very sharp knife we divide, at one stroke, the whole inflammatory tumour completely from end to end, and to a depth equal to that of the disease. In the first variety, we cut half way to the bone; in the second, nearly down to it; and in the third, we cut firmly upon it. The pus is thus evacuated, and the case advances rapidly toward cure, under the use of the bread and milk poultice. From this moment there is rarely much pain, except when the hard edges of the thick cuticle press upon the swelled parts beneath, which is commonly the case in the first variety.

The cuticle becomes detached from the parts beneath in mass, far and wide round the tumour, and should be cut away with a pair of scissors as fast as it is detached. The third variety is often very tedious; for the bone, or a part of it, frequently dies, and is long in being separated from the living periosteum.

Affections similar to whitlow are occasionally seen on other joints of the fingers, in the palm of the hand, and even on the fore-arm; but great care and correct anatomical knowledge are necessary in opening abscesses in these positions, and the cases should be left entirely to surgeons, unless there is the most urgent necessity for interference.

*Nails growing into the flesh.* This is a popular misnomer

—for the deformity of the nail almost always originates in disease of the membrane near the commencement of the last joint of the digit, which secretes it. The pressure of the shoe or grasping with the hand then renders the edge of the nail a cause of irritation; but it is rather the soft parts which grow on to the nail, than the nail which grows into the soft parts.

By prying up the edge of the nail, and placing cotton under it, so as to keep off the soft parts, and by cutting the middle of the nail thin, so as to make it flexible, we may give temporary relief; but we know of no effectual remedy except the application of lunar caustic to the whole sore surface, and repeating the application once a week, if necessary, until the soft parts recede from the nail. The first application is generally attended with considerable pain, but the succeeding ones, when required, give much less inconvenience. This remedy is generally successful. Poultices are employed for a couple of days after each application of caustic, and simple cerate during the remainder of the intervals.

*Biles.*—These troublesome and painful, but by no means dangerous visiters, are generally, though not always, accompanied by florid health, and may then be regarded as a proof of its excess. Those who are subject to a succession of them should avoid salt provisions, stimulants, and spices. If adults, they should purge themselves pretty freely with Epsom salts every other day for a week; if children, with sulphur and cremor tartar. All stimulant drinks and spices are injurious, and the appetite for meat should be sparingly indulged.

A bile is an inflammation of the subcutaneous cellular tissue, (*see* ANATOMY—*skin*,) leaving the skin in health, and is completely limited in extent by the healthy capillaries around it, which completely agglutinate, or close, the surrounding cells. The inflammation of the centre of the tumour is almost always so severe as to cause the mortification of the cellular tissue, which forms what is called the core of the bile, and the abscess cannot possibly recover till this core is discharged; hence the advantage of opening a bile freely with a lancet, which gives a free exit to the dead matter, when detached, instead of trusting to the slow process of nature in destroying the skin by ulceration, which terminates in the formation of one or more small orifices, giving a free escape to the pus, but often retaining the core for a long time. Indeed, we are often compelled to enlarge the natural orifice with the knife, before the dead matter can be removed.

A gently stimulating salve, such as the basilicon ointment, or a mixture of mutton suet and resin, is the most common application to biles, in all stages; but, when at all convenient, the bread and milk poultice is preferable, until the matter is

evacuated, and for two days afterwards. The stimulating plaster then provokes less discharge than the poultice, and promotes the cure.

*Furuncle and Carbuncle.*—Furuncle is an inflammatory tumour, resembling a very small bile in a state of intense irritation, and exquisitely painful. It is not seated beneath the true skin, but in its very substance, and consists in an inflammation of all the soft parts contained in one or more of the minute, tendinous or fibrous rings which form the outer substance of the true skin, each of which gives passage to the delicate extremity of a nerve of sensation, and its accompanying blood vessels. The effect of the rigid rings acting upon such parts, when swelled by inflammation, must be obvious to all. The irritation is raised to the greatest possible height, and the swelling increases, until the soft parts, with the nervous pulp, are strangulated by the fibres, and mortify. Hence the intense pain and the febrile reaction which attend the disease.

The best and least painful mode of treating this affection is to divide the tumour at once, with a sharp knife, and then to dress it with poultices; but, if the patient refuse to submit to this, it must be treated like a common bile.

*Carbuncle* differs from furuncle, in being a progressive inflammation. Located in the same situation, it affects many more of the tendinous rings; and the intensity of the irritation continually causes additional numbers to be added to those already involved, while a wide and spreading purple ring of hardening surrounds this central disease, and paves the way for its increase. The base of the tumour is also hard and deep, involving the subcutaneous cellular tissue even down to the surface of the muscles. After several days of intense agony, an imperfect suppuration comes on, and, flowing into the few unclosed cells of the cellular tissue, renders the tumour peculiarly quaggy or doughy. In the mean time, the centre of the tumour mortifies, and numerous little ulcerations on the skin give partial exit to the ill-conditioned pus. The tendinous rings of the skin partake in the mortification, because their vascular support is entirely cut off by the destruction of the soft parts around them; and the gangrene spreads widely and deeply. During this process, unfortunately, the pain and irritation are not assuaged; for new parts around the circumference of the dead skin are continually taking on the same kind of inflammation, and propagating the disease.

This complaint is peculiar to persons whose constitutions are weakened by disease, luxurious habits of living, or intemperance. It is one of the most painful affections with which humanity is afflicted, and very frequently terminates fatally.

The proper general treatment varies with the condition of the patient. Sometimes the lancet will be applicable in persons not too far advanced in age, or broken down in health; but the symptomatic fever is of a low type, threatening the brain and its membranes especially, and scarcely less powerfully the stomach. After the disease has made some progress, it is very generally necessary to support the strength of the patient by wine whey, wine, bark, and other tonics and stimulants; but these should be employed with caution. Mustard plasters to the feet and wrists, and other means of counter-irritation, when the brain is threatened, have been too much neglected. The spice plaster, mint tea, and alkaline medicines, such as extra-soda-water, or doses of ten grains of super carbonate of soda, will often give relief to sickness of stomach, and the sweet spirits of nitre does good by promoting the tendency to the skin. If there be no acidity of stomach, or vomiting, cremor tartar water, sweetened, will be useful in allaying thirst, and promoting the flow of urine.

As the first local application, a plain bread and milk poultice is best. When the suppuration has advanced, and orifices appear, Peruvian bark may be added; and when the mortification is at its height, the charcoal poultice is advisable. But the disease is terrible, and the local treatment should be vigorous. There are two methods of relief which will frequently save life, if the patient have the nerve to bear, and the practitioner courage to undertake them. The French method consists in dividing the tumour by the knife, in at least two, but if large, in five or six directions; this relieves in considerable degree, the tension and strangulation which cause the violence and spreading of the inflammation and gangrene; but as the incisions cannot reach all the affected rings of the cutis, the relief, though great, is partial. There is no advantage in dividing more than the entire thickness of the true skin; and for this purpose, the cuts should be about half an inch in depth.

A much more philosophical, and really less painful method, though it has a terrible sound, is that of the late Dr. Physick. He recommends the destruction of the entire thickness of the skin over a wide space in the centre of the tumour with the vegetable caustic; which requires to be wet at the end of the stick, and to be rubbed for some time over the surface. This destroys all the strangulating and strangulated parts at once, and with them, the chief cause of pain and irritation. An anthrax or carbuncle sometimes reaches a diameter of six or eight inches.

When the sloughs separate, the surfaces of the fasciæ or muscles beneath, will often be found completely denuded, the enormous ulcer which remains, will be usually in an irritable



or indolent condition, requiring appropriate treatment; and the scars are sometimes a cause of much deformity and inconvenience. The strength of the patient must be supported during recovery, by a generous diet and free air, as the discharges are long protracted and exhausting.

*Canker or Gangrenous Sore Mouth of Children.* This terribly fatal affection is not uncommon in swampy districts, and occasionally appears epidemically on a much wider sphere. Its chief victims are children from the ages of eighteen months to ten years, and it is confined almost exclusively to those whose constitutions have been shocked or debilitated by preceding disease; especially by intermittent or scarlet fever.

The disease appears, at first, as a redness and inflammation along the edges of the gums,—commonly on the incisor teeth of the lower jaw; and it runs pretty rapidly from tooth to tooth. A slight discharge of fetid pus may soon be perceived along the inflamed line, and an evident ulceration soon succeeds.

The inflammation speedily attacks the periosteum of the sockets of the teeth, loosening first one and then another, and extending also to the periosteum of the jaw. The discharge becomes daily more profuse and fetid, and, in a few days, the gums generally begin to swell.

At this stage, the state of simple debility with which the patient had been previously affected, is exchanged for a febrile condition, of a low or sinking character; the tongue is thickly furred in many cases, and the gums and throat are loaded with foul and often adhesive matter.

The child is now unable to pursue his sports or studies, though, until this period, the disease is apt to escape observation, unless the mortality prevalent around them has aroused the attention of the friends. This oversight is often fatal; for the disease advances from this point with fearful rapidity. One or both cheeks begin to swell, and the inflammation runs high. Spots of mortification appear, usually, on the gums, sometimes on the inside of the cheek, or very rarely in the throat. The gangrene spreads in every direction without check,—involving, in a few days, a large portion of the gums, or perhaps the whole thickness of the cheek. It pays no respect to the bone of the jaw; destroying not only the teeth and their sockets, but, where life endures long enough, a large portion of the bone.

The child is sickened and diarrhœa follows, from the quantity of fetid discharge unavoidably swallowed; and exhaustion and death soon close the scene.

This disease was found most terribly mortal from the time at which it was first described by Mr. Pearson, until the pow-

ers of sulphate of copper, as a remedy, were developed by Dr. B. H. Coates, at the Children's Asylum at Philadelphia. It is now manageable by severe measures in a large majority of cases; but after the appearance of mortification, it will prove almost certainly fatal, unless treated by fearless and experienced practitioners.

The support of the patient's strength, and the general treatment, may be regulated according to the directions laid down for excessive suppurations; the mineral acids being highly serviceable as tonics. In addition to this, it is proper to give about half an ounce of sweet oil, and two grains of calomel, daily, when the bowels are disordered by the foul discharges. But the general treatment is of no avail whatever, if the local remedies be not most faithfully applied. The directions for the local treatment are these:—

The moment that the disease is recognised, every tooth must be carefully examined, and if found in the slightest degree loose, with the gum in a suspicious condition, it must be immediately extracted without wasting a thought on the mere loss of appearance. This done, a solution of the sulphate of copper, perfectly saturated, (for a weaker solution is of little value) must be provided. A small slender stick, or piece of whalebone, armed at its extremity with a soft piece of rag, must be dipped into the solution; and, after being thoroughly soaked, the rag must be rubbed freely and firmly over every part of the ulcerated surface, being made to penetrate to the bottom of the socket of every extracted tooth, and between the gum and the bone of all those which remain within the range of the disease. This will occasion some pain, and a little bleeding; but the question is one of life or death, and these inconveniences are trifling. Care must be used to rinse the mouth, after the operation, with sage tea or some other mild gargle, and if possible, to prevent the child from swallowing any portion of the solution, which is a powerful and somewhat dangerous emetic.

The application should be repeated every day until the progress of the disease is arrested, and the discharges have assumed a more natural appearance. The success of the treatment depends mainly on the care with which the solution is made to touch every point of the diseased surface; and it appears to be chiefly on account of the necessity of this contact, that after mortification occurs, the case is generally incurable. The dead surface then prevents the wash from reaching the diseased parts beneath, unless these are soaked through with the solution, or the sloughs are pared away or divided by means of the knife:—alternatives which can be employed only by surgeons.

The skilful practitioner does not despair of even these desperate cases, which are inevitably fatal in popular hands; for cures have occurred after the mortification of the entire thickness of the cheek. The author himself once had occasion, after the partial recovery of such a case, to remove the whole of the upper jaw bones, except the portions supporting the sockets of the two last molar teeth on the right side, and the last molar, on the left. Not only the palatine, but even the orbital processes came away, yet the patient recovered!

Fresh air and cleanliness are as important in this disease as in any febrile complaint; and a change of residence should be made, if practicable, when the location where it occurs is cold or damp.

*Burns and Scalds.* Having already spoken of the effect and general treatment of very extensive burns or scalds, when productive of collapse, (p. 346,) it only remains for us to give some succinct directions for the local treatment of these injuries.

There is little difference between a burn and a scald, except, that in severe cases of the latter, the injured parts retain their moisture, while in the former, when of similar gravity, they are often hardened or rendered crisp by the action of the heat.

In every burn or scald unattended by collapse, the air seems to act as a most powerful stimulant, probably by changing the blood in the distended capillaries to a highly arterialized state. At all events, exposure to the air certainly causes a vast increase of the pain, and heightens seriously the violence of the inflammation. To plunge the part into, or to bathe it freely with cold water, is almost an instinctive, and an apparently rational impulse; but it is found, practically, that water is also a stimulant to the surface, under such circumstances, in no less degree than the air. The cold itself is most grateful, but the injurious chemical or physiological action of the agent by means of which it is applied, far outweighs all the advantage. A burn, should never be touched with cold water while unprotected. By covering the injured part with even a slight pellicle of unctuous matter, not in a rancid state, much of the evil influence of the air, and that of the water, is removed; and the latter may then be employed as a remedy, with considerable benefit in certain cases. We shall speak hereafter of the unexplained effect of cotton,—an article often employed, if not on empirical, at least on hypothetical principles, but one of which the astonishing good effects are no longer questionable. These remarks premised, the reader will understand the reasonableness of our practical directions.

In very small burns, it is found that the scrapings of a raw potato furnish the most decidedly delightful of all applica-

tions; but, unless the part be previously touched with good sweet oil, fresh, unsalted lard or butter, goose grease—or, if nothing better be accessible, pure spermaceti oil, the effects of the potato will be very transient, and the intervals between the renewals of the cold scrapings, (which must be very frequent,) extremely painful.

If no potato be at hand, let the part be oiled, and then held for a long time in cold water. Treated in this way, the severity of the pain will subside in from twenty minutes to two or three hours. After which, if the burn be deep, cold bread and milk poultices, well covered with good oil, form the best dressing.

*In all large burns or scalds*, unattended with collapse, the first question is—Has the cuticle been extensively broken? If not, then let the part be instantly enveloped in carded cotton, which should be kept at hand in every family, in case of accident. If there be a delay of more than twenty minutes in this application, it will be of little service; and if delayed for an hour, it will prove decidedly injurious.

When the article cannot be procured in time, let the parts be well oiled; and if not too extensive, or very inconveniently situated for immersion, the case may then be treated with the cold water: but we have never seen any benefit result from simply bathing the parts with water.

When the situation or extent of the burn precludes the use of this remedy, it should be dressed with the ointment of lime water and sweet oil, in the manner which we shall presently describe.

In burns and scalds with extensive rupture of the cuticle, we cannot with any propriety apply the cotton in the first instance; but after a complete oiling of the part, if the time elapsed after the accident be not too considerable, it may be employed to much advantage. The benefit derived from the application of cotton appears to be limited to about twenty-four hours; it may then be removed carefully, and a dressing applied, consisting of patent lint, linen, or muslin, well coated with lime water and sweet oil. These ingredients may be mixed in equal parts, or with an excess of the former, by shaking them together in a wide-mouthed vial or decanter. They form a kind of white paste, very soft, and extremely agreeable in its effects.

This dressing should be renewed two, three, or four times a day, until a new cuticle begins to form, or until suppuration is established over the surface. When the latter termination takes place, the case is to be treated as a simple *ulcer*. (See p. 338.)

If the burn be deep and severe, so as to harden and render



crisp any part of the skin, this must mortify and slough away. In such cases, it is best to omit the ointment in about forty-eight hours, and then, to use poultices until the sloughs separate; after which the case may be treated as an ulcer.

Burns are extremely apt to give rise to redundant granulation, or *proud flesh*; and when this cannot be held in check, by the means already laid down for the purpose, (p. 341) the tar ointment will be found a valuable remedy. The Kentish ointment should never be employed in burns unattended with collapse; but when the ulcers which remain become decidedly indolent,—which rarely happens,—bathing the parts with brandy is sometimes highly serviceable.

The reaction, and symptomatic fever produced by burns or scalds of moderate extent, should be treated like the same affections in other inflammations, and the excessive and exhausting suppurations which are very apt to occur, render highly necessary the precautions laid down under the appropriate head, (p. 337.)

The cicatrices of burns, when healing, have a disposition to contract and produce deformities which cannot be wholly prevented; but great care should be employed in placing the injured parts in the most natural and useful position, and in retaining them, as nearly as possible, in this state. Where surgeons cannot be obtained, something may be done in this way, even by the intelligent who are not of the profession. For the treatment of burns and scalds productive of collapse, we refer to our remarks contained under the head of *Inflammation, coupled with collapse*, (p. 346.)

*White Swelling*.—The term white swelling implies the enlargement of a joint without dislocation. In this sense, it includes a pretty wide range of morbid affections; but the disease which we shall briefly consider under this head, is the white swelling of the knee joint; the most frequent, perhaps, and the most alarming of all the affections of joints which assume a chronic character. The disease most frequently consists in an inflammation of the synovial membrane; the consequences of which are increased and altered secretion from its internal surface, effusion of lymph into the joint, sometimes a change of structure in the membrane itself, by which it is converted into a gristly substance, and lastly, the effusion of lymph into the common cellular membrane. The cartilage, and even the bones, may be consecutively affected; and sometimes the inflammation, commencing in these last, extends itself from them to the softer parts.

White swelling is often connected with a scrofulous state of the system. In this case, it is much more obstinate and difficult to cure, and the cancellated structure of the bone is the

primary seat of the affection. This form appears most frequently in children, while that which commences in the synovial membrane rarely occurs in young subjects. When inflammation of the synovial membrane subsides spontaneously, the fluid is absorbed. In some instances, the joint regains its figure and power of motion; but in others, it remains permanently stiffened, and swollen; leaving the patient liable to a recurrence of the inflammatory action on exposure to cold, and other local causes. It should not be forgotten that white swelling, though it arise in many of its forms from constitutional causes, may be induced by accident in those who are predisposed to it; so that, if after exposure to cold, a contusion or painful swelling occur in the knee joint, and the swelling long outlast the pain, the case must be immediately submitted to the inspection of a surgeon.

Of the treatment of white swelling we shall say but little; as it requires consummate skill and long experience. One remark, however, will not be misplaced. In the primary stage of all affections of the joints which threaten to become chronic, absolute rest is of the utmost importance. Not only should the patient be restrained from using the hip joint at all, but the horizontal position and perfect quietude must be resolutely maintained. The proper general treatment will be fully noticed under the head of scrofula, when the local disease is connected with a scrofulous habit.

*Hip-joint Disease.* This disease bears considerable resemblance in its nature to white swelling; and, like it, is sometimes, but not always, connected with a scrofulous constitution. The complaint is most frequently seen in children under the age of fourteen; but no sex or condition is exempt from its attacks: and the number of adults and even of old men affected with it is considerable.

The approach of hip disease is much more insidious than that of white swelling, and its primary symptoms are often overlooked or mistaken. The first circumstance to be noticed is a slight limping. The child, for example, in ascending a flight of stairs, will advance the sound leg and draw the other up to it, without attempting to put this one forward in its turn. In walking on a level, the affected limb is either dragged along upon the floor, or the weight is thrown for the moment upon the toes only. In the last case there is an appearance of shortening; in the first, of lengthening of the limb. Both appearances, however, are deceptive. No variation in the length of the limb occurs until a late stage of the complaint, when extensive changes have taken place within the cavity of the joint. The symptom now alluded to arises from the effort made to avoid calling into play the muscles of the affected

limb, as is done in natural walking. When these appearances are noticed, immediate attention must be directed to the suspected hip. If it be really the seat of the disease, the usual depression or dimple between the hip and the nates will be found effaced, and its place supplied by an observable protuberance in most commencing cases.

The seat of the pain at the beginning of the disease, is uncertain, and of itself offers no sufficient evidence of the true state of things. Sometimes it shoots down from the hip to the knee; sometimes it is referred exclusively to the latter part; sometimes to the foot; and sometimes it shifts from place to place, without remaining long fixed in any one spot. Sooner or later, however, and often from the beginning, a fixed pain is experienced in the part above referred to, immediately behind the hip itself. From the first, moreover, if we make pressure either before or behind the hip, we produce an uneasy sensation, sometimes amounting to acute pain. Another circumstance attends the course of the disease:—there is often, even from an early period, an emaciation of the affected thigh and the corresponding leg.

We have dealt somewhat at length on the early symptoms of this disease, from a desire to enable our nonmedical readers to recognise, or at least to suspect its presence at the outset. It has been said, and we believe with truth, that in the primary stage of the disease, mere rest and repeated topical bleeding will accomplish more than can be afterwards effected by large and painful issues, continued for a twelvemonth.

The progress of the disease, when it is allowed to make progress, is various. Sometimes an abscess forms on the joint, and bursts externally, after causing the usual succession of symptoms which accompany deep-seated collections of matter. The abscess usually points below the groin, on the inside of the thigh. This occurrence is commonly followed by hectic fever and a fatal termination. In other cases, without any external evidence of the formation of matter, the cartilages, ligaments, and articular cavity, are destroyed; the head of the bone is dislocated upward; the limb becomes greatly and permanently shortened; and a stiff joint generally ensues in consequence of the union between the head of the thigh bone and the share-bone: but sometimes, as in other dislocations, the head of the bone acquires a degree of mobility in its new situation.

It appears from the evidence of dissections: 1. That the disease commences with ulceration of the cartilages, that of the socket being generally affected at first, and afterward, that of the head of the thigh bone. 2. The ulceration extends to the bones, which becomes carious. 3. An abscess forms in the joint, which makes its way through the synovial membrane

and the capsular ligament, generally bursting on the thigh. 4. In the progress of the disease, all the soft parts about the joint become involved, forming a common confused mass. A distinction, likewise stated on good authority, is, that in cases of a scrofulous character, the primary seat of disease is the bone itself.

It is of the utmost importance, that the domestic observer in this disease, should seek the best surgical aid without delay; contenting himself, until it is obtained, by enjoining the most absolute rest in the horizontal position.

#### SECTION VI.

#### *Corns, Warts, and Moles.*

We have deemed it unnecessary to dwell upon the character or treatment of particular tumours and excrescences resulting from hyper-nutrition, morbid nutrition, or the transformation of tissues; because complaints of these classes admit of sufficient delay to allow the patient to procure medical advice, and but few cases can properly form the subject of domestic treatment under any circumstances; (see p. 151,) but it would be wrong to leave entirely unnoticed the three forms of hyper-nutrition which stand at the head of this section.

*Corns.* It has been stated, in the anatomical chapter of this work, that the nails, hair, &c., are productions of the cuticle; or, at least, resemble that horny membrane. Corns are nothing else than unusual growths of the cuticle, caused by habitual pressure upon prominent portions of the body. They are chiefly confined to the joints of the toes, where they are consequent to the use of tight boots or shoes; but they do not differ from the callosities not unfrequently noticed on the instep, heel, hip, elbow, or knee, when either of these parts is subjected to long-continued pressure. Their consistence seems to be intermediate between that of ordinary cuticle and that of the nails; though, after a time, it becomes analogous to the latter.

These excrescences are themselves incapable of inflammation; but they often occasion great suffering when they inflame the parts around them by their pressure. They sometimes become surrounded by a little abscess, and are then cast off or cured.

The proper treatment of corns is very simple,—and, if faithfully attended to,—almost certainly successful. Let the part be well soaked in warm water; then with a sharp penknife,



pare away the summit of the excrescence until it is level with the sound skin or a little depressed below it. In the next place, provide some buck-skin well coated with good adhesive plaster. Take a circular piece of this, about three times as great in diameter as the corn, and cut a hole in its centre, a little larger than the base of the corn. The plaster is now applied around the excrescence; which occupies the central space, so that nothing can press upon it. The cause being thus removed, the disease soon disappears. If the corn should grow rapidly for a time, let it be frequently retrimmed, and the plaster reapplied.

When corns occur between the toes, it is often impossible to surround them, and it is then best to place one or two layers of the buck-skin between the points of the toes, so as to keep them permanently apart;—but, let it be steadily remembered that the application of a dressing, directly over the excrescence, tends to increase, rather than diminish it.

Under the foregoing treatment, perseveringly and judiciously applied, we believe that a cure will invariably take place in a reasonable time.

*Soft Corns.*—Near the junction of two toes,—where the skin is perpetually folded in contact with itself,—it is not uncommon to observe a thickening and softening of the cuticle, with a thin and red portion of surface in the middle, which bears no slight resemblance to a corn which has been thoroughly soaked, and then cut to the quick in the centre. This affection has been called "*soft corn*," but although frequently associated or complicated with true corns, it is totally different in its nature. The thickening of the cuticle in this case, results from the simple imbibition of the moisture of the part, and the thin, red surface is a portion of skin, transformed by moisture, and the exclusion of air, into a tissue resembling the mucous membrane and secreting a vitiated and strangely fetid mucoid discharge. The affection is often intensely painful: it is sometimes seen surrounding the base of a true corn in the fold of the toes.

In the treatment of soft corns, the separation of the parts is as necessary as in true corns; but there is little disadvantage, here, in applying our dressings directly to the part; for pressure is not among the causes of the disease. The most effectual mode of cure is to keep the toes apart; to wash the sore thoroughly with Castile soap and water, twice every day; then to dust the part well with the powder of carbonate of zinc, and to place a piece of soft patent lint on the diseased surface. Cleanliness, and some drying or separating material occasionally applied are necessary, permanently, to prevent the recurrence of the disease;—an accident always likely to occur, from the constancy of the cause.

*Warts.* These are horny productions rooted in the true skin, and not in the cuticle. They are at first enclosed in a distinct sac, and it is the front part only which is afterwards removed; so that the excrescence seems to be always seated in a cup of membrane by which it is secreted. This membrane must be destroyed, or its functional action changed, before the disease can be cured. When seated, as it usually is, on the palm of the hand, a wart often appears closely connected with the fascia or tendinous sheaths of these parts, with which the true skin lies in close contact. A vascular production of the membrane forming the cup sometimes penetrates far into the body of the wart, and bleeding may then be produced by very slight injuries of the part. On the extremity of the back of a finger, a wart will sometimes adhere firmly even to the periosteum.

It is dangerous to tamper with excrescences of this character, especially when seated on the face; as an injury accidentally inflicted is apt to produce troublesome ulceration; and, on the face, even cancer may be engendered thereby.

Fumigation with hot water, or with hot infusions of aromatic plants, placed in a metallic vessel, and the steamcollected by an inverted funnel, will sometimes remove warts. The steam from a decoction of the root of the narrow-leaved dock, has the reputation of superior virtues, we know not on what ground. The juice of the Garden celendine, and vinegar used as a wash, occasionally succeed.

Lunar caustic is frequently used to produce an absorption of these excrescences, but it is a rather dangerous remedy. If the dread of the knife induce the patient to refuse the best mode of operating, which consists in removing the wart and its membranous base by cutting, the entire destruction of these parts by means of vegetable caustic, which acts deeply and effectively, may be admissible.

Unless there is in the location of the wart, some good reason why it should be removed, it is wisest to leave the case to nature; and spontaneous cures will not unfrequently occur.

*Moles.* These are small tumours, often adhering by a narrow neck, and composed of the same substance with the true skin, from which they are derived. These productions are seldom a source of material uneasiness, but they sometimes disfigure the person, and at others, give rise to inconvenience in sitting, or lying in certain attitudes. The mole should then be removed, either by a single clip with a pair of sharp scissors carried quite down to the base of the production, or, if the connections be wide, by a circular cut with the scalpel or bistoury. The latter operation is the exclusive province of the surgeon, but the former may be safely performed by a friend.

If there be trouble in stopping the bleeding, or if a very small portion of the diseased substance have escaped the scissors, it is well to touch the cut lightly with lunar caustic. Some persons, through dread of cutting instruments, prefer the ligature for removing moles; but this method seldom accomplishes the purpose so completely, and is decidedly more painful than that for which it is substituted.

#### SECTION VII.

##### *Constitutional diseases.*

*Scrofula*.—Which is called also the King's evil, is a constitutional disease, manifesting itself principally by indolent swellings of the absorbent glands, which terminate in imperfect suppuration. The disease is to a certain extent hereditary, but not contagious, and incapable of being communicated by any known means, from an affected to a sound individual. Its usual subjects are children from three to seven years of age; and it has been remarked, that the peculiar physical constitution which enables it to be developed, shows itself by certain obvious external peculiarities. Among these may be mentioned a florid countenance; fair, delicate, glossy complexion; fulness of the upper lip, extending within the nostrils; blue eyes, light hair, &c. These signs, however, cannot be much depended on; for some of the worst cases of scrofula, in this country, occur in persons of dark, dingy complexion and black eyes.

All the circumstances which tend to produce debility are predisposing causes of scrofula; and hence, an unhealthy atmosphere, improper food, uncleanness, cold, &c., are to be regarded in this light. Where these causes co-operate, the disease will often appear independently of any known hereditary influence; whereas, if these are absent, and all external influences are favourable, even children of scrofulous parents will generally escape. For the production of scrofula, therefore, there seems to be requisite, first, a peculiar constitutional tendency, and secondly, the influence of some external morbid agent, to call it into action.

The following description will convey an idea of the course of the disease. It usually commences with a soft swelling in one of the lymphatic glands, most generally, in children, about the ear or neck. The covering or coat of the gland becomes thickened, and the whole mass assumes a soft but tough feel, which may be compared to that of leather. This soon changes

into a character of elasticity, and even of fluctuation, while a firm circumscribed margin can be felt around the base of the tumour. The skin is slightly red. If an incision be made at this time, no matter, or a very little only, will be evacuated; but the wound remains open, exhibiting a slough or core within, between which and the skin a probe can be passed for a considerable distance. At a later period, however, the tumour loses its elastic character, becomes soft and flaccid, and fluctuates freely: the skin assumes a light purple colour, and small veins may be traced on its surface. It soon grows thinner and darker, bursts, and discharges a thin fluid like whey mixed with some portion of curd-like substance. The aperture enlarges as the tumour subsides, and the sore assumes the character of an ulcer, with a smooth, hard, tumid margin, of a purple colour. Its surface is light red; and the granulations are pale and unhealthy. The discharge is thin, and mixed, as before, with curdy flakes. When the ulcer has continued for some time, it begins slowly to heal, the discharge usually diminishing and becoming thicker. An elevated scab, of a dirty white or yellowish colour, is next formed. This continues for some time; then falls off, and leaves the place covered with a purple scar. Sometimes a scrofulous abscess, after bursting, forms a sinus, the mouth of which assumes the usual appearance of a scrofulous sore, while the track of the sinus continues to discharge.

The parts which are most frequently affected with scrofula, next to the lymphatic glands, and perhaps the skin, are the spongy extremities of the bones and the joints. In scrofulous subjects, abscesses similar to those in the glands appear in various parts of the body. Finally, the glands of the mesentery are often found, in scrofulous subjects, to be universally enlarged and diseased; a circumstance which, more than any other, determines the claim of the disease to a constitutional character.

In this country, the prevalence of scrofula is, for the most part, confined to the southern states, where it is very common among the blacks, and to a considerable extent among the emigrants from Europe. Cases of it, often of severe character, are always to be found among the neglected children of the poorer classes in all the principal cities.

As scrofula is essentially a disease of debility, and the predisposition to it is rendered active by all external causes which go to impair the constitution; so both in its prevention and its cure, those means are to be adopted, which have an opposite tendency. If possible, the air of the city should be exchanged for that of the country; that of swampy districts, for drier situations; unwholesome food, for that of better qua-



lity, and the clothing, state of the skin, and regularity of the bowels should be most carefully attended to. Salt water bathing has been recommended as a tonic, peculiarly suited to these cases. In employing salt water, however, we must carefully attend to the power of the system to react under the chill. As respects internal remedies, the tonic bitters have sometimes had the reputation of benefiting the complaint; at others, mild alteratives, as the sarsaparilla; and again, alkaline medicine; but at present, nothing seems to be so much relied on as the iodine, the virtues of which in reducing glandular tumours under certain circumstances are undeniable.

In tumours which have not advanced to suppuration, and which are external, frictions with an ointment of iodine are used locally; but in internal tumours and scrofulous ulcerations, some of the fluid preparations, internally exhibited, are generally preferred.

*Of Cancer.* Cancer generally commences in a hard, well defined, heavy, and sometimes knotty tumour, beginning in the secreting glands, but often propagated to other parts, and terminating in an ulcer with thick margins and a fetid discharge.

A predisposition to cancer is unquestionably hereditary; but with what peculiarities of structure this predisposition is connected, or by what external signs it may be known, is mere matter of conjecture.

Cancer is not contagious; and the experiment of communicating the disease by inoculation has always failed. It is most frequent in women; and the object of its primary attack is most generally the female breast. Unmarried women after the age of forty are most liable to cancer; and, next to these, mothers who have not suckled. Next in the order of frequency, come married women who have reached the period of life above referred to. When cancer occurs in men, it is chiefly in the lips or on the face, where it is commonly caused by the irritation of a peculiar kind of wart.

The accidental or occasional causes which develop the constitutional tendency to cancer, are numerous. Among them may be mentioned various kinds of external injury; pre-existing tumours, accidentally irritated; severe eruptive diseases, and the time of life.

Cancer in the breast usually commences with a small indolent tumour, which for some weeks, months, or even years, attracts little attention. After a longer or shorter period this tumour is affected with itching, which is soon exchanged for a pricking or lancinating pain, often very intense, and generally shooting in the direction of neighbouring glands. A sense of burning, and a livid discoloration of the skin appear still later in the case. When these symptoms are united, the cancerous

character of the disease may be considered as manifest, but previously it is usually termed scirrhus. Hardened bands are now formed in the integuments, which become puckered; and the nipple, gradually retracted, sometimes wholly disappears. At this period the tumour approaches the skin, and feels knotty to the finger, while varicose veins usually begin to show themselves on its surface. Sooner or later the integuments give way in places, and a small quantity of fluid mixed with blood is discharged. The ulcer rapidly enlarges till a considerable cavity is exposed, from which issues a most offensive discharge. At this period, granulations sometimes form; but they are loose, soft, and unhealthy, and seldom extend over the whole surface of the sore. Whatever appearances of a tendency to heal the ulcer may assume from time to time, no real progress is made; its ravages extend until the whole gland is involved, and the weight, pain, and fætor of the tumour render life a burden. Even under these appalling circumstances, however, existence is sometimes wonderfully protracted; and during years of suffering, the vital powers continue their bootless struggle.

When cancer attacks the uterus, it is known by lancinating pains in this organ shooting through the region of the pelvis; and there is, after a time, a mixed, unhealthy discharge, having the peculiar odour which belongs to the disease. Occurring in the stomach, cancer is obscure, and during life is seldom more than suspected. There are acute and burning pain at the pit of the stomach, tenderness on pressure, nausea and rejection of food; but these symptoms do not enable us certainly to discriminate between this disease and many others.

Cancer of the lip usually commences with a slight fissure, or crack, which being irritated by injudicious applications, takes on a malignant form. On the tongue, the disease first manifests itself in a small wart near the tip. Both this and the last form are easily removed by operation, and they rarely return. On the cheek and nose cancer is usually preceded by a wart, which, when not subjected to irritation, may remain harmless for life.

Cancer of the breast, in its early stage, admits of relief from leeching, lead water washes, and the constant application of sheet lead to the surface of the tumour. At a later period, when the ulcerative form is fully developed, the application of arsenic has been much resorted to; and this substance forms the basis of most of the cancer plasters in common use. It is a violent and dangerous caustic. Among internal remedies, the most lauded, perhaps, for a time, was the hemlock, (*conium maculatum*, *cicuta*) but it is found that though this remedy may operate for a few days like a charm, the benefit then suddenly ceases, and an increased dose is required, of which the

effects prove equally transient. Externally, a poultice of cieuta sometimes gives great temporary relief. In fine, it is generally conceded, that there is no cure for cancer, and that the sooner the diseased gland is removed, after its true condition has been satisfactorily ascertained, the better. If the operation be delayed, the disease almost invariably extends itself to the axillary or other neighbouring glands, which are removed with difficulty, and if suffered to remain, will certainly reproduce the disease.

Cancers of the skin rarely return after operations, but those of other parts are extremely prone to do so; partly, because surgeons are too frequently indisposed to extend their operations far enough; partly, because the operations are generally deferred too long; but still more frequently because the disease, instead of being merely local, is the result of a constitutional peculiarity.

*Veneral disease.*—Women of uncleanly habits appear to have the generative organs constantly in a state of sub-acute inflammation, attended with more or less acrid discharge; and in this state seem to be capable of communicating to the other sex, by cohabitation, three principal forms of inflammatory disease. The first of these is termed chancre, and appears first as a pimple of peculiar kind, with a hard inflamed base, of a pale red hue and irritable apex, which opens at a point, becomes ulcerated, and discharges a small portion of limpid virus. The chancre shows itself on the prepuce, glands, or orifice of the urethra. It appears sometimes on the third or fourth day after coition, more commonly, however, a few days later; and sometimes not for several weeks. Instead of chancres, we have occasionally warty excrescences, which may extend over considerable space.

The second effect of impure coition is a tumour in the groin, generally commencing in one or more of the lymphatic glands, enlarging, becoming painful, and generally proceeding to suppuration. If not opened artificially, it bursts, after it has reached a considerable size. Sometimes these inguinal tumours remain indolent, without advancing or receding, for a considerable period. Bubo seldom precedes chancre, or appears independently of it; so that the former is generally considered as a consequence of the latter, produced by the absorption of its peculiar secretion. From both, the inflammation often extends to the spermatic cord, causing it to become enlarged and tender, and likewise to the testicles, which become swollen.

The third affection which may result from the general cause already mentioned, is an inflammation of the mucous surface of the urethra, at first recognised by a burning sensa-

tion in passing the urine, and soon afterward by a discharge of mucus, and then of yellow coloured pus from the passage. The scalding usually subsides in a few days, and the discharge may be diminished almost to nothing, under proper management. This change may occur, even without treatment, in from eight to twenty days; but the discharge frequently changes its consistence, becoming thin, chronic, and continuing, with occasional intermissions, for months, and even years. This disease is also capable of producing a sympathetic affection of the testicles, like that mentioned above as supervening on bubo.

These forms of disease may occur separately or together; and, as we have said, the female is often in a condition to communicate one or all, according to the condition of the recipient. These and other circumstances have led some physicians to the conclusion that the cause which produces these different affections is one and the same, and that the effect is merely modified by peculiarities of constitution in the individual affected. Perhaps the more general opinion however is, that they are not produced by a single poison; that the first two constitute one disease termed *syphilis*, of which the bubo and chancre are alike symptoms, while the third—*gonorrhea*—is a distinct affection emanating from its own peculiar poison, and reproducing itself only.

The secondary symptoms of syphilis, which constitute a most important feature of the disease, commence with soreness and ulcerative inflammation of the tonsils, uvula, palate and tongue; by which the voice is rendered hoarse, and the swallowing obstructed. The ulcers about the throat are foul and rough, having an excavated centre covered with a white or gray slough, and surrounded with a hard, elevated, and deeply red margin. The skin is attacked with an eruption, not of strictly uniform character, but generally attended with copper coloured spots, which at first fall in scurf or scales, and afterwards form scabs; these often degenerate into ulcers, which prove foul, offensive and obstinate. With the advance of the disease, pains are felt shooting through the limbs, and the investing membrane of the bones becomes inflamed and swelled, forming what are termed nodes, especially observable where the bones approach near the skin. The small bones of the palate and nostrils next begin to participate in the disease, and are gradually eroded; the voice becomes nasal and imperfect, and the form of the nose is lost. These secondary symptoms often supervene upon syphilis, but never follow simple gonorrhœa, unless improperly treated by mercury.

The old or Hunterian school, which taught the identity of all the forms of venereal disease, taught also that an actual specific virus was present, in the matter of venereal sores, and



of gonorrheal discharge, which, being absorbed into the system, give rise to the secondary symptoms;—that this virus could never be entirely eradicated by natural effort;—but that mercury possesses a peculiar affinity for the venereal virus, combines with it, and renders it inert, which no other known substance is capable of doing. These opinions are now almost universally discredited. In fact, experience has shown, that secondary symptoms, instead of being peculiar to cases left to nature, supervene quite as frequently on those cases in which mercury has been largely employed; and it is generally conceded that the venereal disease, in all its forms, is capable of spontaneous cure. Nay, so great has been the change of opinion on these subjects, that some of the severest forms in which the secondary disease shows itself, the affections of the bones for example, are, by many, believed to be themselves of mercurial origin, and to be developed by the treatment, rather than the disease.

One of the most interesting, and obscure questions relative to this disease, is that of the laws which regulate its propagation. It is the general opinion,\* that the actual contact of the matter of chancre, or of gonorrhea, is required to produce the disease in a sound individual.

It would appear, therefore, that a husband can communicate either disease to his wife, only so long as the local symptoms continue; and that an individual, while still suffering under constitutional symptoms supposed to be syphilitic in character, may be justified in marrying. But though this proposition may be strictly true as respects the communication of these specific diseases in their primary form, experience abundantly shows, that, from a system affected with secondary symptoms, these symptoms, or others resembling them may be communicated. It seems to be proved beyond a doubt, that a mother affected with the secondary symptoms only, may communicate them to her infant; that an infant so affected may infect its nurse; that a nurse having secondary symptoms, either consequent to primary syphilis, or received from a diseased infant, may again communicate them to another infant;—the peculiar organs in which the primary disease shows itself, remaining mean while unaffected;—and that a father who labours under secondary symptoms, *though he may not communicate them to his wife*, can yet scarcely ever be blessed with a healthy child.

*Treatment.* Opinions are still divided on the question, whether mercury is to be regarded as in any sense a specific in syphilis. The idea, that the disease is incurable without mercury is now abandoned; but this remedy is still considered as one of great value, and, in the majority of cases, will

probably continue to be resorted to. In chancre, a slight mercurial course will cause the ulcer to assume a healthy character, and to granulate kindly; and in bubo it will often prevent the tumour from suppurating. Whether the remedy acts specifically or by counter-irritation is unimportant. It is generally conceded that cures effected by this method are more rapid than when no mercury is employed. In the latter case, it is necessary to subject the patient to severe restrictions in regard to diet, rest, &c., which are attended with far more inconvenience than results from the employment of mercurials when judiciously conducted. Salivation should never be intentionally produced; for a slight swelling of the gums, and sœtor of the breath, are sufficient indications that the specific action has taken place; and this action may be cautiously maintained until there is observed a decided tendency to rapid improvement, which usually happens in from two to six days; the effects being more rapid on chancre than on bubo. Longer than this we would never continue the action of mercury. In the local treatment of chancre it often happens that nothing is requisite but to keep the ulcer clean, either by simple lotions, or by solutions of the astringent salts; as alum, sugar of lead, white vitriol, &c. In addition to this, some ointment must be employed, the choice of which may be regulated by the principles laid down in the sub-section on ulcers, (p. 338.) The ointment, or simple powder of the red precipitate of mercury, is a favourite application, when the ulcer is covered with an adherent gray matter, and the carrot poultice is generally employed in the phagedenic or burrowing form of the disease; but here we much prefer the cicuta poultice.

At the commencement of bubo, the object, as in other incipient abscesses, is to procure resolution. For this purpose, as for the cure of chancre, abundance of mercury was formerly thought the only means; but it was rubbed liberally into the affected groin, in the form of ointment, under the erroneous impression that the mercury would pass through the gland. The same practice is still continued, and with much effect, in promoting a rapid absorption of the tumour. (See sub-section on *excoriations of mucous orifices*, (p. 359.)

When pus appears to have formed, the softening of the tumour must be encouraged by the application of a common poultice; this may indeed be applied in every stage. When the matter approaches the surface, the abscess should be opened, early and freely, to prevent the formation of indolent and thin flaps, which often require to be burned off with caustic, before the cavity can be healed. It happens not unfrequently, that a bubo becomes indolent, and refuses either to

advance or recede. To open a sore of this description would be imprudent. In this state of the parts, blistering is often very useful, and the ointment of white precipitate, or the blue butter, with one drachm of powdered camphor, and one scruple of powdered muriate of ammonia, will be found an excellent application. For our views on the treatment of gonorrhœa, we refer to the sub-section on *termination of inflammation in suppuration*, (p. 337.)

*Scurvy*.—The essential symptom of scurvy is an effusion of blood from the superficial blood vessels, and its appearance in spots, resembling what are called blood blisters, immediately under the cuticle. This, however, and the general debility which accompanies it, are common to two diseases, which differing both in the circumstances under which they arise and in the character of their subjects, have been termed land scurvy and sea scurvy. The first, also called *purpura*, is met with at every period of life, but principally affects persons of weak and delicate constitution. It comes on with lassitude, faintness and pains in the limbs, to which are sometimes added shivering, nausea and vomiting. The purple eruption commonly appears first on the legs, and extends thence to the thigh, arm, and trunk, seldom affecting the face. The spots are numerous on the inside of the mouth, particularly affecting the gums, tonsils, and lips. It is from these that the first bleeding generally occurs; but as the disease advances, blood flows also from the nostrils, lungs, stomach, and intestines; and all these parts are found, on examination after death, studded with spots, similar to those which show themselves on the mucous surface of the mouth. It is by these hemorrhages, and by the absence of sponginess in the gums, that *purpura* is distinguished from sea scurvy.

The causes, both remote and immediate, are obscure: among the former are mentioned, on the one hand, poor diet, impure air, and anxiety; on the other, gluttony and intemperance. The disease equally occurs in the most opposite states of the system; sometimes with feeble pulse and general evidence of exhaustion; sometimes, in full, plethoric habits, which have the appearance of requiring active depletion; and sometimes the general health does not seem at all disturbed. This confusion of causes, however, applies only to the few rare instances which are met with at the present day; for many years since, when the disease was very common in the larger European cities, the causes appear to have been very similar to those which produce sea-scurvy also.

The ravages of sea-scurvy formed, for centuries, the greatest obstacle to the prosecution of maritime enterprise, and its prevention, one of the greatest triumphs of modern art and

science, from the time of the celebrated expedition of Vasco de Gama, in which fifty-six men were lost by this then unknown malady, to that of Captain Cook's voyage in the *Resolution*, this disease constituted one of the most serious evils attending maritime adventures.

So late, in fact, as 1741, the fleet under the command of Captain, afterward Lord Anson, lost half the crews in the space of six months from the time of leaving England.

Some parts of the description of this disease have been anticipated, in speaking of purpura. There is the same weakness and inactivity, with pale, bloated complexion, and a swelling of the lower extremities. If the gums are examined, they will be found spongy, disposed to bleed, and frequently swollen to an enormous extent, and seem as if in a state of decay, while the teeth are loosened in their sockets.

The skin is generally smooth, shining, and covered with bluish or livid spots, not rising above the surface; and these often coalesce, so as to form large blotches. Wherever ulcerations have existed, they break out again, and discharge a thin offensive fluid mixed with blood. A soft, spongy, putrid clot soon forms on their surface, which is with difficulty removed, and when removed, quickly forms again, followed by a fungous excrescence, which has the appearance of liver. When this has been extirpated by the knife or caustic, it is reproduced in a few hours. In the last stage of the disease, blood is discharged from the intestines, and even from the bladder; and the debility is so great that the slightest motion will produce fainting and even death. Yet during the whole course, the sense of pain is slight or wanting; and the spirits often so far outrun the physical power, that the patient, if roused by the stimulus of hope or fear, will often attempt a violent exertion, and perish in the very act.

The proximate cause usually assigned for the symptoms of scurvy, is a putrescent state of the blood; but the remote cause is unquestionably the exclusive employment of salted animal food. We say exclusive; for it appears that the free use of fresh acescent vegetables, or of vegetable acids in any form, will counteract the influence of the salted provision, and enable the stomach to form chyme of laudable character. In long voyages, during which fresh vegetables cannot be depended on, scurvy may be effectually prevented by providing an ample supply of citric acid or lemon juice. This was one of the improvements suggested by Captain Cook, to whom, more than to any other individual, belongs the praise of having discovered the means of resisting this formidable enemy. This, however, was not the only improvement which this skilful navigator introduced into the dietetic regulations of a voyage.



The quality of the food and water, the clothing and personal cleanliness of the men, and the ventilation of the vessel, were all objects of his attention; and such was the success of his benevolent exertions, that he was enabled to fulfil his celebrated voyage of three years and eighteen days, with a company of one hundred and eighteen men, in all latitudes from  $52^{\circ}$  North, to  $71^{\circ}$  South, with the loss of but one individual from disease, and that one, a man who was apparently consumptive when he commenced the voyage. The example thus given has been worthily followed up since his time. At the present day seascurvy is, in the navies of civilized nations, a rare disease. In our own vessels, private and public, it is effectually prevented, by allowing the crews a sufficient proportion of vegetable food and vinegar, by improved means of preserving water free from impurity, and, on long voyages, by furnishing lemon juice, which is still acknowledged to be preferable as a preventive to any other article. The great efforts which have been made of late years to promote cleanliness among seamen, to discourage the use of ardent spirits, and to substitute therefor the more innocent stimulus of tea or coffee, have undoubtedly contributed, among their other good effects, to the diminution of this repulsive and dangerous disease.

## CHAPTER III.

### MEDICAL PRACTICE, OR TREATMENT OF INTERNAL DISEASES.

TRUE to our original intention in offering this work to the public, we shall avoid all those arts by which the composers of treatises on domestic medicine, have endeavoured to encourage the credulous in the belief, that, by a few hours' study, and an occasional reference to a book, they could supersede the necessity of advice from those whose lives and observation are devoted exclusively to the study of disease. We shall endeavour to engross, in the present chapter, such information only, as may be safely and advantageously communicated to the intelligent who are not of the profession, in order to enable them to save human life and suffering where higher assistance is inaccessible or unobtainable in time, without encouraging that rashness which induces the empiric, and certain ignorant professional sectaries, to rush into fearful responsibilities, unnecessarily or criminally. We ardently hope that the result of our labours will be such as to leave us chargeable with no follies committed in the sick room under the sanction of our authority.

#### SECTION I.

##### *Fever.*

The symptom essential to fever, is an altered condition of the nervous system, in consequence of which, the sensations of heat and cold no longer correspond to their usual causes; in which cold is felt, notwithstanding the presence of a warm atmosphere and abundant clothing, or heat notwithstanding their absence. Together with this, there is usually a rapid pulse, headach, and nausea. Fever, in this sense, accompanies, or is a symptom of, various other diseases, particularly inflam-

mations; but the term fever, or general fever, is applied to a state in which the febrile action is dependent on no external or visible local disease.

*Intermittent Fever.*—A regular paroxysm of intermittent fever consists of three stages; and may be thus described. The patient first exhibits evidence of languor and debility, unwillingness to move, and a disposition to yawn on motion, as if aroused from sleep. At this period, the extremities, if examined, will be found cooler than usual, though as yet no change in temperature is obvious to himself. Presently the chill commences, invading the back and then the rest of the body, with a progress which is felt and described as creeping or crawling. The state of chill, when perfect, is marked by a sense of extreme cold, which demands instant augmentation of all the usual appliances for warmth, the nearest possible approach to a fire, and additional clothing, or the protection of a bed; by all which, however, it is but little relieved. At the same time, there is a tremor or shivering, usually more violent than the impression of external cold produces, even on the most susceptible, being wholly beyond the control of the sufferer. At this time, however, if the skin be felt with the hand, it will be found warmer than usual, notwithstanding the chilliness of the sensation. After a certain time, the sense of cold begins to remit, and occasional hot flushes are experienced. This state of things indicates the approach of the second stage. By degrees, the sense of cold ceases, and that of unnatural heat ensues, the heat of surface as manifested to the touch continuing undiminished or increasing. With this change a heightening of colour is developed over many parts, and especially in the face, which becomes of a bright scarlet. The heat and redness become more and more marked for a time, the skin continuing dry, but declining in harshness. At length the third or sweating stage comes on with gradual relief to all the symptoms. The surface of the body becomes cool, the countenance regains its natural aspect, and all things return, for the most part, to their natural state.

There are many other appearances and symptoms peculiar to each, or common to all the stages of fever, some of which it will be proper here to notice. In the cold stage, the pulse is frequent, small, and often irregular; the breathing anxious and sighing, sometimes attended with cough. In the hot stage, the pulse becomes regular, hard, and full, and increases in these qualities, till the sweat begins to break out. The respiration becomes more full and free, but continues frequent and anxious. In the sweating stage, the pulse becomes softer and less frequent, returning gradually to its natural state, and the anxiety and difficulty of breathing are removed.

The appetite, of course, disappears from the commencement till the conclusion of a paroxysm, and, in general, an absolute aversion to food takes its place. Together with this, there is often sickness at the stomach, and vomiting of a bilious matter: this may occur either in the cold or hot stage, but is most common in the former. Thirst and dryness of the mouth and throat continue during the whole paroxysm, but abate as the sweat flows freely. And, lastly, headach, attended with a peculiar throbbing in the temples, together with pain in the back, and often in the limbs, must be enumerated among the symptoms of a paroxysm of fever.

The interval between the paroxysms of an intermittent, is a period of comparative health: and the time which elapses between the commencement of successive paroxysms is that which determines the type of the disease. If this period is twenty-four hours, the fever is termed *quotidian* or daily; if forty-eight, so that the second paroxysm occurs on the third day, counting from the first, inclusive, it is a *tertian*; if seventy-two hours, a *quartan*. Regular intervals are rarely protracted beyond this period.

It may happen that a fever consists only of a single paroxysm, terminating entirely in the first sweating stage. When this result occurs by art, it does not prevent the disease from being ranked as intermittent. But a fever having essentially but one paroxysm, has been termed *ephemeral*. An epidemic of this ephemeral character once prevailed in England, and was called the sweating sickness.

It is foreign to our purpose to enter into the much disputed question of the immediate cause or intimate nature of fever. As respects the remote or external causes of intermittent, they are now generally allowed to be marsh miasmata; that is, the exhalations arising from vegetable substances, partially immersed in a moist soil, and acted upon by the rays of a hot sun; although it frequently happens that febrile miasma appears to be generated independently of this precise combination of causes. Very many of the rivers in our middle and western states, on the margins of which springs a luxurious vegetation, especially if their banks are low, and periodically inundated, are favourite haunts of the affection. But there are facts in regard to the salubrity or unhealthiness of river situations, which are difficult to reconcile with any precise theory; and our own Schuylkill furnishes an example of a river flowing on quietly from year to year in the same channel, and nourishing the same vegetation on its borders, yet in the course of a few years completely changing its character, so that spots in its vicinity once sought for most desirable and delightful retirement, have come to be avoided as if infested



by pestilence. We have dilated on this subject in the chapter on Hygiene.

It is worthy of remark, however, that intermittent fever is sometimes generated in very limited localities, from causes, which, though strictly analogous to those which induce its action on a large scale, may be easily overlooked or misunderstood. In fact, cases occasionally occur among children or peculiarly susceptible subjects, even in the midst of populous cities, and where the drainage is apparently perfect. They are usually found in very confined situations, and especially in cellars, and can be explained only by admitting the presence of a local malaria in such situations, from the vegetable remains which are allowed to accumulate, and the moisture with which they are surrounded.

The treatment of intermittent fever divides itself naturally into, first, the management during the paroxysm; and, secondly, that proper during the interval. As respects the former, it is to be observed, that the obvious design of nature is to obtain relief by means of the sweating stage. The object of art, then, would seem to be to accelerate as much as possible the access of this stage; in other words to shorten the cold fit; for, when the hot fit is once induced, the sweating is seldom long in following it. To accomplish this object, besides indulging the inclination of the patient for warmth externally, we supply him largely with warm diluent drinks, as hot barley water, flax-seed infusion, sage or balm tea, &c., unless the stomach be irritable. These articles tend to diffuse warmth through the system, and, if retained on the stomach, are presently carried off by perspiration. Even when rejected by vomiting, they are not always injurious, for they promote a tendency to the surface. Hot, spirituous potations, such as punch, &c., act injuriously, by rendering the hot stage one of much more intensity than it would otherwise prove to be, and thus cause unnecessary exhaustion. Laudanum and camphor are frequently employed to shorten the cold stage. The first is liable to the objection already urged against spirituous articles. Camphor is what is termed a diffusible stimulant, and, therefore, well suited to effect the purpose. A tea-spoonful of paragoric tincture, which combines the virtues of opium and camphor, may be often given with good effect at the commencement of the cold stage of an intermittent, combined with the sudorifics above alluded to. When much headach is present from the commencement, and particularly if the patient be troubled by ineffectual retchings without vomiting, it is highly proper to give an emetic of a grain of antimony with twenty of ipecacuanha. At the end of twenty-five or thirty minutes the dose may be repeated, if no emesis be produced.

Warm water should be taken freely to promote the operation. This dose is proper for an adult.

But the most important consideration in intermittent fever is, how to prevent the return of a paroxysm. For this purpose, the Peruvian bark, or its preparations, have been employed almost exclusively, from the time when their virtues became known to the civilized world.

In what way or by what law of the system, the cinchona produces its effects, it is difficult to say. The general character of bark, is that of a tonic; and in this view it is generally prescribed for debility, more particularly for the debility incident to, and consequent on fever. The fact that the paroxysms of fever are arrested by the administration of a few grains of bark, is among the best authenticated, as well as most remarkable in medical science. This property, we may add, is not confined to the Peruvian bark; other bitter barks, woods, &c., such as cascarilla, gentian, quassia, and chamomile, likewise possess it: but their virtues are seldom appealed to except as matter of curiosity. A modern improved method, by which the use of the bark in substance, has been superseded, is to extract the bitter principle, or quinine, in the form of a sulphate. This beautiful salt, which is now manufactured in great abundance, in Europe and in this country, has taken the place, almost wholly, of the old forms in which bark was administered. In exhibiting it, the best rule is to commence its use immediately after the close of the paroxysm, and continue it at intervals of one hour in quotidian, two hours in tertian, and three in quartan ague. In order to secure a proper condition of the system for the exhibition of the tonic, it is essential in some cases to exhibit some cathartic medicine, if the evacuations are not spontaneously regular.

If the case be a protracted one, the liver and spleen almost invariably become diseased; and this state is generally accompanied by a jaundiced hue of the eye. It is then proper to have two doses of five grains of calomel taken at bed-time on successive evenings, followed by a little oil, or salts, in the morning, if the calomel does not operate by nine o'clock: this should be done before exhibiting the tonic.

When, under the use of quinine or bark, the paroxysms do not cease, but occur at longer intervals, we are gaining ground, and may calculate on success with a little delay. When, on the contrary, the intervals grow shorter, we are losing ground, and may feel assured that some additional treatment is necessary to moderate the violence of the hot stage. The saline draught and the neutral mixture, if there be sickness, and the sweet spirits of nitre given in the dose of thirty drops every half hour, will often accomplish the purpose: they should be

aided by cold drinks and affusions, or even by the lancet, when the pulse is very high, the skin very hot and dry, and the paroxysm long. Sometimes the intermission is rendered imperfect by the continuance of an obscure, harassing, low fever, through the sweating stage and the interval also. Quinine should not be given, under these circumstances, until the intermission is rendered complete; which may be generally effected by one or two doses of calomel, as ordered above, and the exhibition, during the interval, of an infusion of Virginia snake root, in the proportion of one ounce to the pint of hot water, a wine-glassful to be taken, cold, every hour during the interval and the sweating stage.

The powers of quinine and bark are prodigiously increased, for some inexplicable reason, by the addition of minute portions of sulphate of copper and opium. The two following prescriptions, we have found capable of arresting a great majority of chills, when given during a single interval; a large portion of the balance yield after two intervals, and very few, indeed, resist their use after three intervals. The first prescription is intended for those who prefer taking medicine in the form of pills,—the second, for those who entertain a disgust for that mode of administration.

1. Take,        Sulphate of quinine,                grains xii.  
                  Sulphate of copper in powder,        ii.  
                  Opium in powder,                        ii.  
                  Gum Arabic in powder—a sufficient quantity.

Make these into a mass with a few drops of water, and divide the mass into twelve pills.

Dose—one pill.

2. Take,        Sulphate of quinine,                grains xii.  
                  Sulphate of copper,                        ii.

Put them in a six ounce phial, with two ounces of water, and shake them well.

Then add,

- |                    |             |
|--------------------|-------------|
| Elixir of vitriol, | drops xxiv. |
| Laudanum,          | xxx.        |

Shake the phial again, and then fill it with water.

Dose—a table spoonful.

The medicine, given as ordered above, according to the length of the interval, should be continued till bed-time on the day on which the chill is missed for the first time, and this day should be noted.

There is a strong tendency, in an intermittent which has been checked, to return on the seventh, fourteenth, or twenty-

first day: to prevent this disaster, a dose of one or the other of the above prescriptions should be taken in the morning, at noon, and at night, on each of the days here named, counting from the day on which the paroxysm first failed to appear; viz. the sixth, seventh, thirteenth, fourteenth, twentieth, and twenty-first days. By faithfully following this direction, the patient will very rarely experience another attack, for at least six months; which is as long an indemnity as can be reasonably asked by those who continue to reside in an infected district.

Although quinine may be almost with certainty depended on for remedying an attack of intermittent fever, and the system remains secure for a time, continued exposure to the same malaria will again induce it, and even removal to a more salubrious climate is not always a safeguard. The individual who has frequently suffered, sometimes retains a remarkable susceptibility to the disease for years, and even for a whole life. In such individuals, simple exposure to cold will often be sufficient to induce an attack. For awhile, these relapses are cured with the same ease as the first attack; but after some time the quinine seems to lose its effect. Under these circumstances, the Fowler's Solution, an arsenical preparation, has been found a valuable substitute. It is employed in doses of ten drops, taken at intervals; but it is an article altogether too dangerous for domestic use.

*Continued fever.* A paroxysm of intermittent, as above described, may be considered as a type or model of all febrile affections, to which all bear more or less of resemblance. But there is a large class of fevers in which the regular sequence of symptoms which belongs to the intermittent fails to be observed. The access, it is true, is usually with chill, which is succeeded by a sensation of heat. Pain in the head and back, loss of appetite, thirst and restlessness, are also present. But these fevers differ wholly from regular intermittent in the following circumstances. The commencing chill is less violent, and often not attended with absolute rigour or shaking; the hot stage, when fully formed, may continue with little change in the degree of heat for many hours or even days; and there is no regular termination by sweat. The natural state of the functions, instead of being restored at the expiration of six, eight, or ten hours, oftentimes does not return for as many weeks; but once restored, the whole force of the morbid action is exhausted, and there remains no tendency to a new paroxysm. Such is the general character of continued fevers. But as under this class are embraced diseases of very different character, it will be better at once to separate them; reserving for distinct notice the bilious, remittent, or yellow fever, as likewise the petechial or spotted fever, and the ma-



lignant typhus, all which are diseases of very fatal tendency, and considering at present the common inflammatory or continued fever, together with the mild typhus or slow fever, which is the form into which the former passes when protracted naturally.

The commencing symptoms of continued fever have been described. Its approach is insidious, and generally the stage of chill has already been succeeded by heat before it attracts notice. Then the patient is found with flushed face, suffused eyes, hot skin, quick, hard pulse, tongue loaded with secretion, thirsty, very restless, and in the severer cases slightly delirious, yet without other pain than that referred to the head, and an aching sensation in the back and limbs. The disease is seldom allowed to make progress without interference, for experience has so fully proved the utility of attempting to arrest it, and so clearly pointed out the means of so doing, that these means are probably universally resorted to. The relief urgently demanded at this period, is to be gained in a very large proportion of cases by the simple exhibition of an emetic; in a smaller number by the same remedy, preceded by bleeding; and a still smaller, perhaps, by bleeding alone. The latter is most beneficial when it produces free perspiration and excites vomiting, which it not unfrequently does. The rejection of the contents of the stomach, followed by a free discharge of bile, gives great relief to the head, and serves in many instances wholly to arrest and break up the fever. Should the latter not happen, the patient obtains after some hours a remission of the symptoms, the pulse becoming slower and softer, the skin more cool, countenance brighter, thirst less, mind clear and tranquil. These favourable changes, when transitory only, are most usually remarked in the early part of the day; towards evening an aggravation again takes place. When this alternation has continued for a few days, one of two things takes place. Either gradual improvement occurs with the recovery of appetite, a natural coolness of the skin, the restoration of the strength, &c., or the fever changes its type. The return of daily febrile action ceases to be observed, or becomes very slight. The pulse sometimes falls below its natural standard to sixty, or even fifty beats per minute. The body is pale and cool; but, on any exertion, a sudden flush will be noticed in the cheeks, especially in children, which subsides when the occasion which produced it is passed. The disposition to speak, or even to reply to questions, is lost. The adult answers after a moment's hesitation, and in a drawling tone; the child speaks in whispers. Little attention is given to surrounding objects: the sight, hearing, and, as far as can be as-

certained, smell and sense of feeling are benumbed; the eyes, when examined, have a staring expression, as if scarcely affected by light, and the pupils will be observed unnaturally dilated. The balls are often suffused with tears. There is no thirst, and little appetite, though scarcely an aversion to food, for small quantities are willingly taken, especially by children. The alvine discharges become slow and sluggish. From this state the patient may, and often does recover, after a tedious confinement of eight, ten, twelve, or sometimes twenty weeks, with extreme emaciation, and almost total loss of strength. If fatal, death usually takes place in the third or fourth week, though such a termination may occur at any time. Among the symptoms of a graver character than those above mentioned, are what is called coma, and delirium; the former being a deep, heavy, protracted sleep, from which the patient is roused with some difficulty; the latter evinced by a low muttering of incoherent sentences, and a half-dreaming state, during which the most singular phenomena are occasionally noticed almost to the last. The attention can be recalled, with some effort, to what is passing around. Recovery in protracted cases is sometimes followed by wild insanity, which, however, is almost always curable in the course of a few months.

Such is a sketch of the mild typhus or slow nervous fever of our own country, a disease most observed, perhaps, in our northern and middle states, but known very well to practitioners at the west and south. Its medical treatment belongs, of necessity, exclusively to the profession; and there is less occasion for opening the subject here, because the slow and gradual progress of the symptoms affords ample time and opportunity to obtain medical advice.

But to that important part of the direction of these cases which falls under the denomination of nursing, attendance, and general management, we wish to call especial attention. These subjects are too often overlooked or neglected in practice, for the very reason that their practical application requires that patience, firmness, self-command and perseverance, which, though among the best, are among the rarest qualities of our nature.

*Cleanliness* may be justly ranked as first in importance among the duties of a sick-room. Between the indolence which avoids all avoidable trouble; the indulgence which cannot bear to inflict immediate inconvenience for the sake of subsequent benefit, and the fear which shuns the responsibility of any decided measure, even the necessity of neatness is too often lost sight of; and, among those who should both know and do better, negligences are permitted which the parties

concerned would blush to see exposed. We do not hesitate to lay it down as a general rule, that there is no state or stage of fever, in which the exposed part of the person may not be daily washed, the linen about the person daily changed, and the bed daily made. Even in cases of extreme debility these things may be done, so as to afford far more permanent comfort to the sufferer than the temporary inconvenience caused, provided the process be managed with gentleness and discretion. For the mere purpose of washing, slightly tepid water may be employed; but there is a refreshing influence in the application of cold water to the face, hands and wrists, during the heat of continued fever, which is sometimes indescribable, and which is not attended with any subsequent ill effect. The skin for a time is relieved of its burning sensation and dryness, becoming soft, moist, and natural in temperature, and this effect will often continue for a considerable time. The mouth and teeth should not be neglected at any period, and as soon as his strength will permit, the patient should be encouraged to attend to them for himself. As respects the neatness of the sick-room, the necessity of removing every article which is, or is likely to become offensive, little need be said. Among the nuisances, however, which are apt to collect in a sick-room, and to which too much indulgence is shown, are the vials, boxes, papers, &c., the contents of which are but partially consumed. Let them be banished without hesitation, as soon as their use is discontinued.

Temperature and ventilation. Patients almost always know when the bed-clothing is insufficient, or the room too cold; but the due caution to prevent the body from being too much covered, or the room over-heated, is by no means so general. Attendants should be exceedingly attentive on this point, and complaint on the part of the patient should be prevented by anticipation. Ventilation is important at all seasons; and though more difficult to effect consistently with comfort in winter than in summer, it may be managed at all times. The air can be suffered to gain admittance from a door, if not from a window, in the course of every day, for a sufficient time to dissipate any noxious effluvia. A window opening downward at a distance of fifteen or twenty feet from the bed, is almost always available for this purpose.

The subject of administering food and drink in fever, is the source of perplexity to many well-meaning persons, who, though perfectly satisfied that the natural appetite is a good guide in regard to this matter in health, cannot easily be persuaded that this is equally the case in disease. To a great extent, however, such is the fact. During the early period, or while active symptoms are present, the inclination for solid

food is not only absent, but an absolute aversion to it is generally present. Liquids are sought for with great avidity, and the purest and simplest water is the most agreeable. As the ardour of the fever subsides, the desire for drink, especially for cold liquid, is lessened, and often some warm slightly nutritious beverage as tea, gruel, arrow root, &c., is found very palatable. As the fever still farther abates, and the previously coated tongue clears, the appetite for solids returns, though the desire is generally found to be easily appeased. In the protracted cases which we have attempted above to describe, there is rather a willingness than an absolute desire to eat, rather a sense of emptiness than appetite, and indulgence, while it gives little pleasure, is yet found to relieve an uneasy sensation.

For the most part, we apprehend, these promptings of nature may be depended on, provided we are careful to exhibit only the milder articles of food in small quantities frequently repeated. Some exceptions or limitations to the rule occur in children, in persons greatly advanced in life, in those whose minds are enfeebled by long illness, in patients who suffer from habitual indigestion, and in persons prone to habitual excess. To lay down precise rules for the management of each of these classes of patients, would require an elaborate essay, and the consideration of many topics which do not enter into our plan. By the exercise of sound discretion serious errors may be avoided, and even mistakes, when not too serious, work out their own remedies. The following suggestions, however, the result of some observation in this matter, may not be found useless.

Persons of mature age and of sound mind, may be indulged in simple water at any time, to any extent they desire, if not affected with obstinate vomiting. Children and childish persons may be limited in regard to the quantity, but not as to the frequency of the indulgence. The same may be said with more confidence of the simple infusions, as toast-water, balm tea, &c., because, being somewhat repulsive in taste, they are not likely to be taken in excess, even by the most thoughtless.

To children, as soon as the desire for solid food returns, it is perfectly safe to allow a dry biscuit, which requires some action of the teeth to put it in a condition to be swallowed, and the very trouble the indulgence costs is the best safeguard against excess.

No patient of any age should be urged to eat, nor should the nutritious liquids above referred to, the gruel, &c., be insisted on, unless by express order of a physician. Many persons are averse to these preparations, and want no food till they are able to return to their ordinary repast of tea or coffee and toast, or even till they can indulge in some light animal nourishment.



When an experiment in diet which is regarded as doubtful is to be tried, let the trial be made in the early part of the day. An article not thought of till the hour of dinner is passed, if it require any preparation, had better be deferred till next day. This rule is peculiarly important during the first few days of convalescence, while there is still a tendency to febrile action towards evening. To take this period for an indulgence in itself allowed to be of questionable character, is obviously inconsistent with wholesome discretion.

No rule can be given in regard to these cravings which are felt by convalescents for such dietetic anomalies, as salt fish, dried beef, pickled oysters, &c. The gratification sought in these cases is one of the taste rather than the appetite, and a taste is all that is needed. We have heard an anecdote of a distinguished practitioner, who, in reply to an importunate request of a patient, that she might be indulged in cider, said, "Certainly, my, dear, a tea-spoonfull three times a day." Scarcely any thing need be feared, if the quantity be but small enough.

Although purposely avoiding the details of treatment in this department, we deem one subject,—the regulation of the alvine discharges in fever,—too important to pass over in silence. The tendency to constipation, though not uniform, is still frequent. It may be obviated either by due regulation of the diet, such as will be noticed under the head of dyspepsia; or by administering one of the cathartics in common use, in a quantity just sufficient to effect the object, and no more. The solicitude felt on this subject by attendants and nurses is often carried to excess, and leads to an improper interference with the natural tendencies and demands of the system. The tendency obviously is to appropriate very thoroughly the nutriment which enters the stomach, and to leave but a very small residuum, and that in a state not very favourable to its spontaneous expulsion. If this residuum be allowed to remain too long, it will probably become a source of irritation; but if its evacuation be unduly urged, the digestion is not properly effected, and the benefit of the nutriment is in a degree lost. Other inconveniences of powerful evacuants will be considered hereafter. It is sufficient at present to observe that, in convalescence from fever, only the mildest laxatives should be employed. Generally speaking, the use of some mild saccharine or sub-acid fruit, as stewed prunes or tamarind, will be sufficient; or, if any proper medicinal article is needed, a little confection of senna, the rhubarb pill, or a tea-spoonful of oil in emulsion, may be substituted.

On one subject connected with the management of the sick-room, we must be excused for speaking with some severity.

We allude to the admission of unnecessary or improper attendants and visitors into the apartment. Not only in fevers, but in the whole range of nervous affections, even when mild, it is of the utmost importance to prevent all unnecessary excitement of the senses or the mind of the patient. The room should be darkened, to relieve the eye, and a heavy tread, or a creaking shoe should never be tolerated. In severe cases, and particularly those attended with giddiness or great irritability of stomach, the mere presence or absence of a continued monotonous sound or an unvarying motion, such as the oscillation of a rocking-chair, will sometimes determine, as we know by actual experience, the result of life or death! A nurse who argues and disputes with others, in the presence of a patient, should be immediately dismissed. A practitioner who so far forgets the duties of his station, as to raise his voice, or indulge his temper, or annoy the patient with disagreeable and irrelevant conversation, or alarm him by appearing after indulgence in dissipation, whatever be his talent or standing, should be tolerated only when no more reasonable or creditable assistance can be possibly obtained.

Religious services in the sick room should be very short and very quiet. Singing, and especially singing in concert, is very reprehensible. A clergyman who knows the true duties of his calling, and prefers the true service of his Master, to the exercise of petty influence or the gratification of a silly vanity, will always consider the advice of the medical attendant, both with regard to the time and duration of his services; and he should also recollect that, either from respect or policy, the practitioner generally avoids carrying his expressed cautions on such subjects to the extent which justice to the patient demands.

But what shall we say to the kind friends whose anxiety for the patient induce them to insist on admittance? *The face of a friend* is often more serviceable than medicine, more invigorating than wine! *but the faces of a dozen*, are worse than intoxication.

Independently of the noise and excitement produced, the mere presence of numbers poisons the very air which the sick man breathes, and renders even the healthy liable to contract disease. This habit of crowding a sick room is chiefly noticed among the vulgar, and is often tolerated by anxious friends, for fear of giving offence; but let it be remembered that none but the weak and prejudiced can be offended at being deprived of the power to injure those whom they profess to love; and where health is at stake, the value of such friendship is *a negative quantity*.

There are two pests of the sick room with which we have

no patience. They are of both sexes, but of totally distinct species,—though too frequently, both are *relations of the patient*.

The first—mild, kind, and prompted by the best of motives—is a soothing and low voice, which flows, however, with an almost ceaseless current, inquires into all the feelings of the patient and all the directions of the physician; begs the former to be of good cheer and trust in Providence, hoping that every thing is for the best; but states that Mr. A——, and Mrs. B——, and little C——, all laboured under just such symptoms—that the first was saved from Death's door by good Dr. D——, under a totally different course of treatment—that the second seemed to be doing well for a long time under *the attending physician*, but died unexpectedly on the twentieth day! and that poor little C—— recovered directly under the use of Cayenne pepper and the hot bath! The kind friend leaves the apartment with the assurance that the patient looks very ill, but exhorts him to be of good cheer and hope for the best, quietly breathing in the ear of the nurse or wife,—“My dear! It's a very bad case! Had you not better call in Dr. D——?”

The other annoyance is of an opposite character—Rough, strong, active, and either blustering or bustling, according to the sex—totally incognizant of disease and incredulous of debility,—it enters the chamber with a hurried or a heavy tread. If of the masculine variety, it accosts the patient in a loud tone, in something like the following terms—“Come! come! This will never do! You are nervous! You would be well enough if you would but think so, and throw your medicines out of the window. Nurse! you must not suffer your patient's spirits to sink. I have gone through as much trouble and exposure as any one, in my time; but I never gave way, and was never sick a day in my life. This all comes of over indulgence and nervousness! You should ride out and take the air, and call your friends about you, and you would be well directly. Here, Nurse! I have brought him a bottle of wine. Never mind the doctor and his orders! As I had nothing to do this evening, I thought I would just step over and sit an hour with him to keep up his spirits!”

We have suffered less than many from the folly of these *friendly* homicides, having made it through life a principle of action always to cause their immediate ejection, or to abdicate ourselves—but having witnessed incalculable suffering from such proceedings, and hoping that a few may be startled by these true pictures, into something like a rational course of conduct, we have sketched them from the memory of former years.

*Bilious Remittent, and Yellow Fever.* As it is not our

design to enter into the treatment of fevers, except so far as to secure the patient against loss of time, when the physician is not immediately accessible, it is less important for us to go into any examination of the arguments for and against the identity of the bilious remittent, and yellow fevers. After simply announcing our faith in the fact that all fevers are symptomatic of local inflammation, or irritation in certain parts, either internal or external, and that its varieties depend upon the peculiar organs thus affected, we have only to state our inability to discover any difference in the seats of the two forms of fever just mentioned, in order to convince the reader that we regard them as differing only in intensity.

The bilious remittent is but a somewhat more complicated variety of the common remittent, which we have described under the title of continued fever. Its peculiarities consist chiefly in a more serious implication of the liver, giving rise to more obstinate constipation, or to a diarrhœa caused by vitiated bile, and a yellow or jaundiced hue of the skin; also, a greater irritability of stomach, which is apt to occasion violent vomiting, which becomes, in some cases, almost uncontrollable.

The treatment recommended in the commencement of continued fever, generally, is applicable here; but there is even stronger necessity for early medical advice; for the disease, if left to itself, is much less prone to fall into the low and protracted state, and more liable to a rapidly fatal termination. As advice is not always accessible, it may be proper to state, that the treatment laid down for yellow fever is applicable to bilious remittent, when moderately employed; and that, in certain situations, the latter, when epidemic, is often nearly as fatal as the former; into which it finally merges itself at certain points on our western waters.

*Yellow Fever* has been said to be a disease of comparatively recent origin. The first distinct account of its appearance was given at Barbadoes in the year 1647. It occurred at Boston in 1693. Its first appearance in Europe is referred to 1723, when it broke out in Lisbon. After some years it declined in severity, but recurred with new violence about 1793, and since that year has raged with varying intensity in the south of Europe, the tropical part of Asia, and the West Indies. It has long been a summer epidemic of New Orleans, Charleston, S. C., &c., and was repeatedly destructive in the city of Philadelphia in 1768, 1793, 1797, 1798, 1799. It showed itself more mildly in 1802, 1805, and 1820. New York has also suffered several times. Among the local causes which produce it, one of the most active, undoubtedly, is the effluvia of decaying vegetable matter; but these are insufficient



without the epidemic tendency; it has been generally believed to have been imported, and then propagated by contagion in our northern cities. But this is a subject which we will not discuss at present, farther than to state, that the belief in its importation and contagiousness increases in just proportion to the distance to which we retire from those countries where the disease is best known and understood. It is termed yellow fever, from the tinge assumed by the skin of persons affected; black vomit, from the peculiar matter rejected from the stomach; and, sometimes, palludal or marsh fever, from its local origin. The peculiar symptoms by which it is distinguished from other continued fevers, are the following:—The chill is slight, never amounting to absolute shivering, but generally accompanied with faintness. Sickness of the stomach exists from the first, and the retching increases with the disease. At first, the matter vomited is yellow, on the second or third day, it becomes green, and towards the fatal termination, black or of a slate colour and resembling coffee-grounds in consistence. The yellow colour of the skin, which is by no means peculiar to this disease, is first developed on the third or fourth day, in the eyes, neck, and breast, and thence extends to the rest of the body, which, in fatal cases, becomes yellow throughout. The urine, when observed, is of a dark saffron colour. The tongue is first covered with a moist, yellowish white coat, then becomes drier and more discoloured, and finally quite black. The time required for the disease to reach its fatal termination is very various; in some instances, not exceeding twenty-four hours, in which cases the yellow colour of the skin is much less strongly marked. When it runs to four or five days, it exhibits decided remissions, such as would lead an inexperienced person to anticipate recovery, and often the spirits and strength revive only a few hours before death. When the peculiar vomiting, above mentioned, has once taken place, the disease almost always proves fatal.

From the very various opinions respecting the treatment of yellow fever, it is not easy to select rules adapted to general use. As in the milder cases, various modes of management will be found successful, so in the severer, all must share the disgrace of failure. In the last, however, the general result of experience seems to be, that a copious bleeding, that is, a bleeding carried to the extent of producing faintness, is more likely than any other remedy to effect a favourable impression at the outset, to relieve the headach, soften the pulse, and check the vomiting. The blood should be drawn in an erect or sitting posture, and in a full stream. In this way, faintness is the sooner induced, and the advantages of the bleeding gained with the least possible loss to the system.

The effect of the blood-letting in reducing the system, is to be immediately followed up by a powerful cathartic; an ounce of Epsom, or an ounce and a half of Rochelle salts, for example, which must be repeated every four hours till full operation is produced. Should this active treatment succeed in controlling the primary symptoms, in arresting the vomiting, for example, and relieving the headach, the subsequent management of the case is simple. Ventilation and cold affusion, to diminish burning heat of skin, must be employed during the remainder of the fever, and bark and wine during the period of convalescence.

If the salts be rejected, or if the vomiting be severe, a spice plaster should be applied, and lime water and milk—one table-spoonful of each—may be given every five or ten minutes, and the moment the retching is lulled, a dose of ten grains of calomel in our country, or twenty in a tropical climate, should be administered, in a small portion of molasses or honey,—cold lemonade by the half wine-glass at a time may be fearlessly given, after this, for three or four hours, when, if the stomach be composed, and the thirst great, cold drinks should be taken freely. When calomel is given in purgative doses, not immoderate in quantity, the dread of cold after it is in a great degree a prejudice. To secure the operation of the purgative without disturbing the stomach, an ounce of Epsom salts may be dissolved in a gill of water, and half a wine-glassful taken every hour. Having diminished the pulse by bleeding, lessened the temperature by cold effusions, composed the stomach, and allowed our purgative time to produce an impression—(three hours are sufficient for this,) all our attention should be given to the production of perspiration in mild cases; but when the case is very threatening, and the epidemic rapidly fatal, this course should be coupled with the attempt to touch the mouth with mercury. For the former purpose, the following articles may be employed singly, or alternately, or in succession, according to the degree of vascular reaction and the ability of the stomach to bear them. The saline draught given every hour; sweet spirits of nitre, forty drops every two hours, in a little water; the infusion of Virginia snake root, a wine-glassful every two hours; and, if there be little tendency to the head remaining, the Dover's powder, ten grains every three hours. The two latter articles alternated every hour and a half, with some warm tea in the interval, act very powerfully. The mercurial course cannot be attempted by the domestic practitioner under any circumstances with safety.

*Petechial or Spotted Fever* derives its name from the appearance which it exhibits of dark coloured spots upon the skin, caused by the extravasation of blood beneath the cuticle.

As described by European authors, it is a malignant typhus, a variety of the putrid typhus, camp, or jail fever, a disease of which we have fortunately little experience in this country, and of which we shall only remark, that it exhibits in an aggravated form all the symptoms which we have enumerated as belonging to our own protracted nervous fever. A peculiar form of spotted fever, however, has been repeatedly epidemic in this country, particularly in the eastern states. From the descriptions of eye-witnesses, it seems to be one of direct prostration, without any preceding stage of excitement. It bears, in fact, a striking resemblance to malignant cholera, so much so, that many very intelligent observers have maintained its identity with that disease. An eminent physician of New England describes it as a nervous fever, in which the stage of reaction is wanting, the torpid or forming stage, and that of exhaustion being blended together, attended with pain in the head, and vertigo, and paroxysms of gastric sinking, and, for the most part, with a cool skin, a slow pulse, and the absence of all febrile smell. "Petechial eruptions, ecchymoses, general injection of the capillaries, coma, delirium, palpitation, numbness, and insusceptibility to the action of ordinary rubefacients and blisters, and sinking after evacuations, are much more common than in any other febrile disease." The same author admits that coldness, pain, numbness, spasms, vomiting and purging, are common to both diseases. These facts would seem to distinguish spotted fever very decidedly from other febrile affections. On the other hand, it is said that it is only in the severe and suddenly fatal cases, that its resemblance to cholera is so great. Ordinary cases of sinking typhus so much resemble common nervous fever, that without a previous history, the best judges, if present during a paroxysm of ordinary sinking, would scarcely discern the difference. "In its severest form," adds the author already quoted, "I have seen it destroy life within six hours after its attack, and within one hour after a prudent family became sufficiently apprehensive to send for a physician. It was attended with vomiting and diarrhœa; in other words, was a case of cholera. Other cases have been distinctly marked, and yet so slight as not to require the patient's keeping his bed. It varies equally with respect to its duration. It is sometimes broken up within a few hours from its access, but more generally continues five or seven days; at other times, especially when it is complicated with common typhus, and often when it is only a mild disease, it is protracted two, three or four weeks, and even occasionally two or three months. Dr. Miner, in *N. E. Jour.* vii. 23. The long protracted cases seem to prove a broad distinction between this form of disease and cholera; but when it is recollected that collapse in the latter is often followed by a

stage of reaction in which the disease answers very nearly the character of low typhus, the distinction will appear less marked. The most essential difference between the two diseases is, perhaps, the circumstance, that in sinking typhus, the brain is the chief seat of derangement, while in cholera it is the stomach. "In general," says Dr. Miner, "there is greater weight of disease in the brain, and coma or delirium is much more frequent in sinking typhus than in cholera." Dr. M. tells us that the application of blisters to the head relieved the cerebral symptoms; but in the general treatment of this form of typhus, nothing but the most active stimulants would answer. On the commencement of the attack, heat was applied to the surface by means of hot bricks, bottles of hot water, &c., while laudanum, alcohol, the essential oils, and hot liquids were the internal remedies. Neither emetics, cathartics, nor depletion of any kind was employed from the time when the character of the disease came to be fully understood. Treated on these principles, the fever was generally relieved at the outset, and convalescence was manifest in the course of six or eight days.

## SECTION II.

### *Eruptive Diseases.*

*Small-Pox.*—Having gone through the consideration of general or simple fevers, we now come to a few very remarkable diseases, in which, after a continued fever of some hours, or days, an eruption is thrown out upon the skin, which forms at once the leading characteristic of the affection, and by the progress of which the disease is limited. Such is the case with small-pox. This disease commences with many of the symptoms of ordinary fever, chill followed by heat, pains in the head and loins, extending to the extremities, restlessness, thirst. These usually commence at night, and undergo some remission during the day, to be renewed with increased intensity at its close. There is often a severe burning sensation in the stomach, and a soreness of throat, attended with considerable degree of hoarseness. At this time a peculiar odour frequently arises from the skin of adults, and from the breath of children, which is perfectly evident to every one on entering the room. The eyes are red and shining, and are often suffused with tears, while the membrane of the mouth and the gums appear fuller than natural. Bleeding from the nose is



not unusual in children. In subjects of a full habit and sanguine temperament, especially women and children, a rose-coloured rash sometimes precedes the eruption, commencing on the face, and thence passing to the trunk and extremities. It sometimes shows itself as early as the second day, but most generally later, and appears so much like measles, that even experienced persons have been deceived. On the third day, it is not uncommon for children to have an attack of convulsions. The eruption itself usually appears late on the third, or on the morning of the fourth day, about eighty hours from the commencement of the fever. It is seen first on the nose and lips, extends to the face and head, and afterwards invades the neck, chest, trunk, arms and legs. It commences in the form of small red circular spots or pimples, which, at first much scattered, multiply rapidly, and in the course of two or three days, invade the whole surface of the skin, and even extend into the mouth, and to the internal membrane of the eyelids. On the appearance of the eruption, the fever subsides; the pains in the head, back, and loins, and the increased heat, are much diminished, and sometimes vanish entirely. On the second or third day of their appearance, the pimples exhibit a little limpid or watery fluid at their tip, and gradually pass into their second or vesicular stage, in which they present a rounded or hemispheric bladder, filled with a clear but viscid liquid: this, as well as the subsequent changes, following the original order of the eruption, from above downward. In another day the vesicles flatten at the top, so as to present a slight depression at the centre. This change, however, is principally remarked upon the face, the vesicles in the extremities retaining their rounded form much longer. As the vesicles attain their full size, the parts around them swell and redden, and this to such an extent in the face, that the features can with difficulty be recognised. On the sixth or seventh day of the eruption, its form undergoes another change. The vesicles lose their smooth and semi-transparent aspect, and grow rough and whitish. The opacity increases, and the colour deepens till it reaches that of straw or cream. A small speck now appears in the centre of each vesicle, which spreads till it covers the whole surface. Mean while the vesicle is converted into a cyst filled with matter resembling puss. This change, which is called the maturation of the vesicles, is accompanied with an increase of fever, marked by chills, heat, headach, thirst, and sometimes torpor and delirium. This is a period of danger. On the eighth or ninth day of the eruption, the fourth or drying stage commences. Some of the pustules break, and discharge their matter, which crusts upon the surface; in others, the crusting goes on internally; but all are converted into solid, hard,

brown, and dry masses, which gradually fall off. During this process, the secondary fever declines, and the redness which surrounded the pustules, fades and disappears. Each pimple requires from twelve to fifteen days to complete its course. The whole period from the commencement of the fever to the disappearance of the scabs from the extremities is, therefore, from eighteen to twenty-one days. The scars left by the scabs, are first red, but soon change to purple, and at length either disappear entirely, or sinking deeper, become permanent pits.

In the above description of the progress of small-pox, we have principally had in view the *distinct* form of the eruption. The confluent form differs mainly in the following particulars. 1. The previous fever is much more severe, assuming a typhus form, often with delirium, and sometimes terminating fatally. 2. The eruption often appears on the second day of fever, and always earlier than in the discrete form. 3. It shows itself nearly at the same moment in every part of the body. 4. When the pimples become vesicular, they increase rapidly in breadth, and, wherever numerous, tend to coalesce and run together. This character, which gives its name to the variety of the disease, is retained throughout; and when the drying process occurs, the face is covered with a continuous scab, which falls off in large masses. 5. The vesicles, where distinct, never rise into a spherical form, like those of distinct small-pox, but are flat and irregular in outline. 6. Suppuration takes place less regularly and perfectly, and the fluid never acquires the deep yellow tinge, and thick consistence, which is observed in the distinct form. 7. The secondary fever is most severe as late as the eleventh day; and is accompanied by the secretion of an extremely viscid saliva, which is raised with great difficulty. This is the period of greatest danger. Torpor and delirium frequently supervene, and the patient dies apoplectic.

The present treatment of small-pox, displays perhaps one of the greatest of the improvements of modern medicine. It was once thought necessary, in order to prevent the repulsion of the eruption from the surface, and throw out the morbid virus more fully, to guard the patient from all access of fresh air, to keep his body loaded with clothing, and to supply him plentifully with hot and stimulating potions. The mortality under this system of management was dreadful; being about one out of four among adults, and one out of seven among infants. At present, the opposite system is pursued. Abundant ventilation is allowed; the patient is permitted just such clothing as is comfortable, and drinks his water or lemonade at any temperature which suits him. The other treatment consists mainly

in the due regulation of the bowels, in protecting the eyes, in controlling the fever at the outset, and guarding against exhaustion in the later stage.

Aperient medicines are not often needed for the first of these purposes, and sometimes a few drops of laudanum may even be demanded to check diarrhœa. The second object is effected by keeping the room moderately darkened. The third purpose,—that of reducing the fever,—is effected by the ordinary depletive measures, which have been considered under general fever. As respects the fourth, it is certain, that some stimulus, as that of wine or porter, is sometimes required about the 15th day of the disease, when the secondary fever has assumed a decidedly sinking character. The necessity for this treatment is pointed out by a weak and failing pulse, dry dark tongue, crust on teeth, and low muttering delirium. The amount of alcohol which can be borne under these circumstances, without causing headach or intoxication, is often surprisingly great. It is sometimes necessary in the course of the disease to apply a blister to the chest in order to relieve cough; and this may be done without regard to the eruption on the part. The hardened mucus and half separated scabs which impede the passages of the throat and nostrils, must be patiently removed by syringing or otherwise, as they produce constant annoyance and are a serious obstacle to respiration.

Small-pox is decidedly contagious, and communicable to unprotected individuals by contact with, or a near approach to, a diseased patient.

Within what limits the activity of the contagion is confined, has not been ascertained. It is probable that no virus capable of communicating the disease, is generated in the system before the eruption appears. It is also admitted that the matter of contagion will remain for a long time attached to the body and bed-clothes which have been employed about the sick, unless washed and exposed to the air: and that the apartments, if not duly ventilated and cleaned, will retain, for a considerable period, a miasma capable of giving the disease. Persons visiting patients with small-pox, even for a short time, may convey the disease in their persons or clothing.

Susceptibility to small-pox contagion, is by no means universal; but those who escape, though unprotected, at one time, may suffer at another.

It has been maintained by very high authorities, that those who have had a regular attack of small-pox, may be exposed to the contagion in any way, with entire impunity. This is now fully disproved; and, unhappily, it is not even certain, that a second attack, under such circumstances, will be milder than the first; for the case has occurred in which an individual

has recovered from the first, fallen victim to the second attack! This, however, is extremely rare. The cases of a second attack, milder than the first, are more numerous, but still to be regarded as remarkable exceptions to a general rule.

Inoculated small-pox is rarely seen in this country, as the practice of vaccination has almost wholly superseded true inoculation. As the latter operation is now considered wholly unwarrantable, we shall avoid all allusion to its results.

The term *varioid disease* is now applied to small-pox eruption, as it appears in those who have previously had either the natural or inoculated disease, or who have been vaccinated. As neither of these occurrences can be depended on with absolute certainty to modify the character of a subsequent spontaneous eruption, it is evident that varioid must, in its severest form, be undistinguishable from small-pox; but as in the large majority of cases it is a much milder affection, it is proper to give it a peculiar name. The following are the points in which varioid usually differs from genuine small-pox. 1. The precursory symptoms are less violent and of shorter duration; and the whole course of the eruption is more promptly completed. 2. The pocks are less regular in the order of their appearance and in their distribution. 3. Varioid is not attended with secondary fever, or salivation; the swelling of the surface is inconsiderable or wanting, and the whole train of symptoms comparatively mild.

*Chicken-pox.* A disease resembling in its essential particulars that which is now known to us as chicken-pox, has existed, and been described ever since the dark ages; yet it is still disputed, whether the affection be distinct, or merely a variety of small pox, modified either by the constitution of the individual, or by the circumstance of a previous infection. The latter opinion has been ably maintained by two eminent European professors; but the former view is adopted by the great majority of medical authorities of the present day, and the arguments in its favour seem decidedly to preponderate. Chicken-pox has often prevailed, epidemically, over extensive portions of this country, without any material variation from a standard form, and without ever assuming the peculiar symptom of variolous disease. When observed, side by side, with small-pox in our cities, there is seldom any difficulty in distinguishing them. The following description of the course of the disease, and the remarks which follow, will, we hope, place this important distinction in a clear light.

Chicken-pox is sometimes, but not always, preceded by distinct precursive fever, of the same general character with that which has been described, as announcing the approach of small-pox. On the third day, the eruption appears in the



form of small inflamed spots, commonly showing themselves, first, on the back and breast. These spots have little prominence, are of a pale red hue, and exhibit smooth and shining surfaces. In a few hours, a minute vesicle may be seen rising up in their centre, with a whitish, transparent, and extremely thin covering. On the second day of the eruption, the vesicles increase, and occupy nearly the whole of the inflamed spots, so as to resemble little bladders of fluid situated on narrow inflamed bases. Their form is irregular. They easily give way under pressure, and communicate to the finger a soft, elastic sensation, like pressure on a wet sponge. If punctured, the vesicles collapse and fall to the level of the skin. On the third day, the fluid becomes turbid, and by the fourth, many of the vesicles break and form crusts, the contents of the others condensing and hardening within them. On the fifth day, most of the vesicles are broken, and their little pellicles collapsing, adhere to the skin beneath, so as to confine a little fluid in the tubular ring which remains. The drying process goes on rapidly, and by the sixth day, all the vesicles are converted into small soft brownish crusts, which gradually contract into scabs. From the seventh to the tenth day, the scabs separate and fall off, not in a single piece, but in small fragments, leaving some transitory traces in the skin. The febrile symptoms, if any have been developed, decline on the second day of the eruption, and do not again recur.

Chicken-pox, therefore, is equally distinguished from small-pox and varioloid.

*Cow-pox.* The terms vaccine disease and cow-pox, both refer, as is well known, to the original source from which the infection was derived; but we are not aware, that vaccine matter has ever been obtained from the cow in this country; and it has been found extremely difficult to procure it from the animal, even in those parts of England where it was first observed by Jenner. Whether by the numerous transmissions it has undergone, during the last fifty years, the virus has lost any thing of its prophylactic power, is a question not easily answered; but the weight of opinion is decidedly against this view. The time required by the disease to complete its course, and the successive appearances presented, are, as far as can be ascertained, still the same as at the introduction of the disease. Though the anticipations entertained of its effect, as affording a certain immunity from small-pox, appear not to be fully realized, the exceptions, if we exclude the cases of varioloid disease, which do not endanger life, are too rare to be regarded as very important.

It is fully established, that vaccination is as sure a protective against small-pox, as this disease itself, in either of its forms.

Indeed, the results of strict investigation within a few years go to show, that the degree of protection is even greater. In regard to the other much agitated question, whether the effect of vaccination is permanent upon those on whom it is practised, or whether, after a certain number of years, the susceptibility to small-pox returns, a difference of opinion still prevails.

Experience seems to justify the idea, that in certain constitutions, a second vaccination will afford an immunity, which the first had failed to confer; but whether this depends on an originally unexhausted susceptibility, or is the effect of time, it is not easy to say. A large majority of the attempts at revaccination, which have been made, have failed in producing any specific effect; the puncture has exhibited slight inflammation for a few days, and then has entirely healed. This result has been manifested as clearly after an interval of thirty years, as at any shorter period. The idea, therefore, that the effect uniformly dies at the end of seven years, or any other definite period, seems wholly unsupported. On the other hand, in cases where revaccination appears to succeed, it may often be suspected that the progress of the former vaccination was imperfect; a suspicion, for which the careless manner in which the operation is frequently performed affords abundant grounds. The strongest array of facts, in favor of revaccination, which is known to us, is contained in the *Medico-Chirurgical Journal*, for January, 1834. If that statement be correct, it is conclusive in regard to the propriety of performing the operation under circumstances of peculiar exposure.

The vaccine disease may be communicated either from a fresh vesicle during its progress, or by means of the dry crust which falls off, when the process is completed. The latter method is by far the best for the domestic operation.

The scab or crust, should be carefully preserved in waxed cloth, and when used, a small portion of it should be crushed or cut down to the state of fine powder, with the heel of a thumb lancet, then mixed with a drop of water, and rubbed into a paste. The surest mode of communicating the disease is this. With the heel of the thumb lancet, chafe the cuticle on the middle of the outside of the arm, till it is reddened over a space of half an inch. Then spread a portion of the paste upon the centre of this space. Then, with the point of the lancet, make half a dozen light scratches, close together, through the paste, and just deep enough to give a trace of blood, without causing a drop to flow; spread the remaining paste over the scratches, and let it dry there. About the third or fourth day, the germ of the future vesicle can be traced in an extremely minute pimple, scarcely prominent above the

surface of the skin. On the fifth or sixth day, a little fluid is effused. On the seventh or eighth, the vesicle is perfect, with the upper surface depressed or cupped, and a red margin of a few lines in diameter. On the ninth and tenth, this margin spreads, the part becomes swollen, tense, and painful, the axillary glands are enlarged, and some restlessness and other evidences of general irritation are present. At this time, a rash, more or less general, often shows itself, principally observable on the chest and neck, and resembling that already described as appearing in small-pox. The vesicle gradually loses its concave surface, becomes flat, or convex, extends in size, and the contained fluid becomes opaque and viscid. On the eleventh and twelfth days, the areola begins to fade, sometimes from the external margin, but generally from an intermediate circle, so as to form a whiter zone, which can often be distinguished for many hours. The swelling now rapidly diminishes, and the vesicle gradually dries. In the course of three or four days, the latter is converted into a scab, which hardens, becomes more and more prominent, and distinct from the surrounding skin, and from the eighteenth to the twenty-fourth day, is either rubbed off by accidental violence, or falls off of itself. The progress of these changes should be very regular; and any material aberration, other than a mere delay in the first appearance of the vesicle, renders the result doubtful. Vaccination should never be performed during bad health, or the progress of another eruption.

*Measles.*—This disease is probably always received by contagion, that is, by the touch, or near approach of some one already suffering under it. Measles is more common in winter and spring, than in summer and autumn; more frequent in children than in adults, but by no means limited by any circumstances of season or of age. Genuine measles seldom occurs more than once during life, and when judiciously treated is not often fatal.

The commencing symptoms of measles, which are developed from ten to fourteen days after exposure, are a tickling sensation about the nostrils, with sneezing, watering of the eyes, dry, husky cough, and, in general, the appearances presented at the outset of a catarrh. The presence of fever is also indicated by the usual signs, a hot, dry skin, headach, thirst, &c. On the fourth day of fever, the eruption makes its appearance, at first in deep-red, distinct pimples, which become fainter and more confused as the disease advances, and collect in patches of irregular form, with intervals of nearly natural appearance. The febrile symptoms are not relieved, and sometimes are aggravated, on the appearance of the rash. The headach and fever abate in the morning to be renewed at night, and the

hoarseness, cough, &c., continue without much abatement, as long as the eruption lasts. This begins to subside on the third or fourth day from its appearance; the redness diminishing, and the skin assuming a mealy appearance, while scales are thrown off in the form of a fine dust. At this period, in favourable cases, the other symptoms subside; but sometimes the eyes continue tender and inflamed, and sometimes the cough remains. When the disease has been particularly severe, a torpid, lethargic state sometimes supervenes on the subsidence of the eruption: this is common also to scarlet fever, and will be noticed under that head.

Active medical treatment is not usually required in measles. The eyes should be protected from the light; some laxative medicine administered; and the relief of the catarrh promoted by giving plenty of barley water and gruel, until the appetite returns. The body should be protected and the skin shielded from currents of air. The temperature of the drinks is not very important. The cough and difficulty of breathing may often be relieved by exposing the head, well covered, to the steam of warm water or of vinegar. If the cough be severe, and accompanied with pain, more active measures must be resorted to under the guidance of a physician. A moderate looseness occurring toward the close of the disease, is a source of relief, and must not be rashly interfered with.

At the outset, measles are sometimes liable to be confounded with scarlet fever; but it is to be remembered, that in the last disease there is no sneezing, and no watering or swelling about the eyes, which in measles are always present.

*Scarlet Fever.* For many years past, this disease has been regarded through most of the United States as the most dangerous and formidable affection of childhood. Where not immediately destructive to life, scarlet fever often prostrates the nervous power of the system, and lays the foundation for permanent debility.

According to the views of many medical writers, scarlet fever and malignant sore throat, both often epidemic, and both specific, are yet to be regarded as distinct diseases; although it is allowed, that the latter is generally accompanied with a scarlet rash. For practical purposes, it is best to consider them as one and the same; keeping it in mind, that as scarlet fever, peculiarly so called, may occur, and even prevail epidemically, without sore throat, so may the latter appear, accompanied with a scarcely perceptible efflorescence.

Scarlet fever, when epidemic, does not seem to be dependent for its production on contagion alone. When, however, this source can be traced, it appears to take effect in about



three or four days. The eruption, which is nearly simultaneous with the fever, consists at first of minute red points, soon confounded in a general blush, which extends itself over the whole surface, but is chiefly manifest on the face and breast. The colour of this blush is a bright scarlet, not seen in measles, nor in any other disease. On close examination, the small points of the skin will still be found inflamed, and slightly prominent; but the roughness thus produced has not the coarseness felt in measles. The appearance of a full and extensive efflorescence is a favourable sign; for the fuller the eruption, the milder will be the febrile symptoms, and the affection of the throat. The approach of the latter, which may occur as soon, or even sooner than the rash, is marked by a difficulty of swallowing, and sense of soreness. On examination, the tonsils, and the neighbouring parts of the passage are found swollen, and intensely red; and, in a short time, patches of a white or ashy colour are observed, which indicate that ulceration of the mucous membrane has already taken place. As the swelling and ulceration increase, every attempt to swallow is attended with much distress, and frequently liquids taken into the mouth are forced into the nostrils. During this state of the parts, the fever suffers no permanent diminution and little remission; the thirst is extreme, the skin hot, headach intense, the sleep broken by dreaming, startings, and twitchings of the limbs; and not unfrequently delirium is present. Mean while the eruption, perhaps, after fading and reappearing, finally subsides. On the sixth or seventh day of the fever, the whitish sloughs are loosened and thrown off, the ulcers heal, with relief to all the symptoms, and, in favourable cases, the disease terminates from the sixth to the ninth day. When it is otherwise, death may take place from the violence of the fever at an early period, or the fever may pass into a typhoid state, with a series of symptoms nearly resembling those which have been described under the head of continued fever, and which may run on for six or eight weeks, though usually with eventual recovery.

Scarlet fever is more frequent in children than adults, and, among the latter, in women than in men. Its severity and danger, however, both augment with age. It occurs, in general, but once during life; but instances of a second attack are said to be more frequent than in measles. On this subject, however, testimony is not uniform. Dr. Willan, of London, saw 2000 cases, only two of which were known to be of this character.

In treating this disease, as its absolute arrest, by any means, is not to be expected, three objects are to be kept in view. 1.

To moderate the violence of the febrile action; 2. To subdue those symptoms which immediately threaten life; 3. To counteract debility.

. For the first purpose, the principal agent which has been relied upon is cold, applied externally to the surface by sponging and bathing, and internally by the use of iced water and ice itself. It has been even proposed to plunge the whole body, during the full development of the eruption, into cold water, and thus reduce at once the temperature of the surface: a violence scarcely to be justified by any circumstances whatever. Other means of moderating the fever are offered by the administration of the neutral salts, and especially of nitre, which, when swallowed in substance in small portions, is thought to produce a beneficial local action on the throat itself. The second object is to be answered, in cases where the inflammation and swelling are excessive, by general bleeding, and the abstraction of blood from the neck by leeches. The third is perhaps the most important, as the stage of debility soon arrives, and the condition of the system which accompanies it must be promptly met. As soon then as the active fever subsides, if a state of languor, prostration, and debility succeed; if the tongue remain loaded, the bowels torpid, and the spirits depressed; especially if the ulcers refuse to heal and assume a foul and unhealthy aspect, no time is to be lost; bark, wine, and the acids must be given internally, gargles of the same character employed for the throat, and every means resorted to, for preventing irritation of the digestive system, and supplying it with mild nourishment. The typhoid state, to which we have alluded as a sequel common to this disease and to measles, is peculiarly protracted and obstinate in children. Sometimes such a degree of debility is induced that the articulation is wholly lost, the limbs are perfectly paralyzed, and the mental powers prostrated. In this state it is through the stomach, an organ only a little less weakened than the others, that these are to be slowly re-established. The patience, perseverance, and care, necessary for the task, can only be realized by one to whom the charge has been committed. From day to day the same discouragements are renewed, and it is only after weeks of patient and assiduous labour that hope seems to dawn, and the efforts of affection and duty once more promise to be crowned with success.

*Miliary Fever or Sweat Eruption.* The name of this disease sufficiently explains its origin. It occurs in persons of loose fibre and indolent habits, who have been keeping up a profuse discharge from the skin for several days by lying in bed in warm apartments, and covered with too much clothing. Women are more liable to it than men, and it occurs very fre-

quently in child-bed—when the system is already weakened, and the constant use of warm diluent drinks often increase the excessive sweating.

It usually appears in minute red points much like those seen in the commencement of measles, being most numerous on whatever part of the body has been kept warmest. The sweat which accompanies it is frequently of offensive odour; it is principally troublesome by itching and tingling, and is attended with thirst, heat of skin, and often a coated and foul tongue. The period of its duration depends on the continuance of the causes which produced it. If external heat and internal stimulants be continued, lest the eruption should be driven in, the latter may be kept up indefinitely; but if the clothing be diminished, the surface exposed in a reasonable measure to the air, hot drinks avoided, and the surface sponged occasionally with cool water, particularly if to these means be added a gentle saline cathartic, the disease subsides in a few days.

A form of this complaint, better entitled to the appellation of eruptive fever, is mentioned by authors as occasionally epidemic. The fever precedes the eruption by about three days, the disease runs on, with variable remissions, for seven, fourteen, or even twenty-one days, and usually terminates in a natural sweat. It has sometimes proved fatal.

*Nettle-rash.*—Nettle-rash is characterized by the appearance of wheals, or broad, flat, florid elevations of the skin, accompanied with itching and tingling, appearing successively in different parts, and fading and reviving very irregularly. Its most frequent remote cause is the presence in the stomach of food, either poisonous in itself, or disagreeing with the constitution of the patient. Such are cucumbers, mushrooms, crabs, shrimps, herring, muscles, some kinds of honey, mackerel, and oysters at particular seasons, &c. Even strawberries have been known to produce it, and, much more frequently, fresh pork, goose, &c. Some of the mineral substances, as also copaiba and prussic acid, have the same power in some cases.

It sometimes occurs as an eruptive fever, ushered in by a regular chill, and the eruption shows itself on the second day. In the dyspeptic form of the affection, the removal of the offending matter usually affords relief; though sometimes it continues obstinate for several days. In the febrile variety little medical treatment is needed. A cooling aperient may be given, and vinegar or brandy may be applied to the skin for the relief of the itching. In some cases, bleeding has been found necessary; and in others, a few grains of super-carbonate of soda are found very useful occasionally. The disease

appears to become chronic in certain cases; but these will be found to depend upon some continued error of diet, which corrected, the eruption will disappear.

*Prickly Heat or Lichen* is a disease caused by intense and long continued heat; but it may be excited by the same causes which produce the nettle-rash, when the system is prepared for it. It is one of the most annoying plagues of a tropical climate. The general character of the disease is that of "a diffuse eruption, with red pimples, and a troublesome sense of tingling or pricking." There is more or less general irritation, and sometimes a little fever at the commencement. In its milder form, it first appears with distinct red papillæ about the cheeks and chin, or on the arms, with little inflammation around their base. In the course of three or four days, the eruption spreads over the neck, body, and lower extremities, producing an unpleasant sensation of itching, often aggravated at meals and during the night. In a week or ten days, the colour of the eruption fades, and the cuticle separates in scurf. This is the common form; but we find that from external heat, and sometimes from internal disorder, a vivid rash is often thrown out, consisting principally of deep red pimples, occasionally degenerating into wheals like those of the nettle rash, which remain for a considerable time, unless the atmospheric or other causes are removed. For the relief of the itching and burning sensation attendant on prickly heat, which in tropical countries are often absolutely intolerable, the best applications are brandy and cold water; the latter requiring some caution when the patient is perspiring.

The slightest stimulant either in food or drink, will often drive the new-comer in Bengal, from the dinner table to the bath, much to the amusement of the company.

We have even seen life endangered in Calcutta, by the excessive irritation in Lichen, which sometimes renders the whole surface of the person thick and hard, like some leprous affections; but this state always results from gross indulgence in food or drink, and soon moderates on its discontinuance.

*Shingles* are sometimes, but not generally, preceded by some constitutional affection, as sickness and headach. The first local symptoms perceived, are itching and tingling in some part of the trunk, which, when examined, is found to be studded with small red patches of an irregular shape, at a little distance from each other, on each of which numerous minute elevations are seen clustering together. These are easily perceived to be vesicular in their character. In the course of twenty-four hours they enlarge to the size of small pearls, perfectly transparent, and containing a limpid fluid. The clusters are of various diameters, from one or two and even three



inches, and are surrounded by a narrow red margin. For three or four days, other clusters continue to arise with considerable regularity, nearly in a line with the first, extending always towards the spine at one extremity, and toward the breast-bone or median line of the belly at the other, till they form a half circle. Sometimes the disease nearly, but never entirely, encircles the neck, arm or knee. Instances of its taking a longitudinal direction, are very rare. In five or six days, the fluid of the vesicles assume a pearl-like colour and becomes nearly purulent. If the inflammation be unusually severe, it may be actually converted into pus. Between the second and fourth days, some of the vesicles burst spontaneously, and discharge a limpid fluid. The cuticle is thus detached, and the cutis exposed, leaving many inflamed surfaces, which for a few days secrete a turbid fluid. Others shrink up and are transformed into scabs, which fall off, leaving a red and inflamed surface.

The causes of the shingles are not very well understood, it shows itself mostly in summer, or the commencement of autumn, and frequently in connexion with impure air, an unwholesome diet, and other causes of debility. As respects treatment, a warm bath may be required at the outset, after which little is needed, except to regulate the diet and the evacuations.

*Ringworm* is an affection resembling shingles in some respects, but is much slighter, appearing in patches more or less circular,—whence its name—the vesicles existing principally on the margin of the patches, the central portion being red, tender, and disposed to peel off in branny scales. A single circular patch often runs through its course, in from one to six weeks; but a new crop springs up in the neighbourhood, and so on in succession for an indefinite period.

For the cure of this affection, astringent washes, as solutions of sugar of lead, white vitriol, borax, &c., are in use, as is likewise, laudanum, diluted with an equal or larger quantity of water.

Ink, which is a popular means of cure, may be useful either by its acid or astringent ingredient. In general, ointments do not answer, but a blister often produces an immediate cure. Attention to cleanliness is of the first consequence, and the spots may be washed to any extent with soap and water. Ringworm has sometimes appeared to be contagious, and an account is now before us of an instance in which a young girl affected with the disease, communicated it in a boarding-school, so that fourteen out of seventeen pupils were successively attacked.

*The itch* has been described as “a cutaneous inflammation, without fever, consisting of vesicles containing a serous or limpid fluid, which may appear on any part of the surface, but are found

principally in the flexures of the joints, and between the fingers and toes.” In the severer cases, and later stages of the affection, the vesicles degenerate into pustules, containing a yellow matter, and these, sometimes coalescing, form irregular and unsightly blotches. Itch may spontaneously arise from filthy and negligent habits; but it is usually received by contagion. Adults take the disease less readily, and when contracted by them, it remains dormant for a longer time.

Itch, at its first appearance, is sometimes difficult to distinguish from other eruptions; but when it has become confirmed, the coexistence of the pimple, the vesicle, the pustule, and the scab, the absence of fever, the close aggregation of the eruption in the particular parts already mentioned, and the circumstances under which it shows itself, are sufficient to determine its nature.

Many intelligent writers assert, that the proximate cause of itch is a peculiar insect, which is often found in the pustules; but the necessary connexion between the disease and the animal is not sufficiently supported by evidence.

When itch has continued for a long time, and extended itself to the surface, generally, its sudden removal by treatment has been said to produce internal disease, and even mental derangement. But, as a general rule, no hesitation should be felt in curing it by the speediest possible method; for it is never known to cease spontaneously. In the treatment, various applications have been employed with nearly equal success; since it seems sufficient to induce a new action in the part by some active stimulus. Thus sulphur, zinc, mercury, arsenic, alum, tobacco, and tar, can each boast of its cures, and preparations, dependent on one or more of them for their virtues have, at different times, enjoyed the reputation of specifics. The common mode of employing sulphur, is to prepare an ointment of this article with lard, and rub it well into the affected parts, for two or three successive nights, before a warm fire; after which the skin must be thoroughly washed. It is usual to administer the sulphur, internally, in slightly laxative doses;—an innocent treatment, and one which may prevent a repulsion of the disease from the skin. A neater mode of employing the same stimulant, is the use of a sulphur bath, the patient being enclosed in a box, so that his face only is exposed to the external air, and the fumes of the sulphur being admitted from below. Other ointments and lotions for the itch are in common use; but it is needless to describe them.

*The rose rash* appears in a blush, similar to that which belongs to the specific febrile eruptions. It has been mistaken,

in fact, for scarlet fever, from which it differs in this circumstance, that the redness is removed by slight pressure, and returns at once over the whole part pressed upon, when the pressure is removed; whereas, in scarlet fever, this return of redness is more gradual, and extends from the circumference toward the centre. The resemblance, however, is such that children have been supposed to have scarlet fever several times in succession; an error, which attention to the above mentioned circumstance, and to the slowness of the general affection, will be sufficient to prevent. Rose rash most frequently occurs during the first dentition, especially when acid is present in the stomach, and it disappears with the removal of the irritation by which it was occasioned. In adults, it may occur during the heat of summer, somewhat in the manner of lichen, and run a regular course of three or four days, then disappearing spontaneously. It sometimes takes an annular or ring-like form, with a white space in the centre. These rings are at first small, but gradually dilate to the diameter of half an inch.

*The gum rash* is mostly characterized by vivid minute pimples, thickly set upon a surface of a light red colour. Sometimes, however, the pimples are whitish, and hence the distinction of white and red gum. This disease, in one of its forms, shows itself in infancy, within two or three days of birth. In another, it appears like the last, from teething; and again, occasionally supervenes on over-heating of the skin, or disturbance of the stomach. Whatever the form, this rash is always attended with considerable itching, and is aggravated by excess in clothing and warmth.

*Pruriginous rash* is characterized by intense itching, and an eruption of pimples nearly of the colour of the skin, which concrete into black scabs. It is, to a considerable extent, the disease of old age; and it is frequently induced by uncleanly habits, conjoined with residence in low, damp, unhealthy situations. The skin in this disease is extremely sensitive, and the itching is increased by the irritation of woollen clothing, &c. From scratching, and attrition, the pimples sometimes degenerate into small sores, which keep up a discharge for an indefinite period, and may resemble the worst forms of the itch.

There are numerous, we might almost say numberless, other cutaneous diseases, upon which we could occupy considerable space; but, as these are for the most part distinguished with difficulty, as they are often extremely unmanageable, and, more especially, because none of them necessarily require prompt treatment, we prefer omitting them in a work which is de-

signed merely to assist the intelligent who are not of the profession in their endeavours to be safely serviceable, and not to supply the place of the physician when accessible.

We will now pass to the consideration of some very serious affections, a few of which properly belong to the eruptive fevers; but which we have thrown into a separate section in order to preserve their connexion with some other diseases, with which they are often involved in intimate complication.

### SECTION III.

#### *Erysipelatous Affections.*

*Erysipelas* is an eruptive fever of a typhoid character, occurring more frequently in persons in advanced life, or those of debilitated constitutions, but confined to no age or condition. It often breaks out, as a limited epidemic, in hospitals, jails, &c.

Its approach is insidious, the preceding fever being often very slight. Sometimes there is chill, succeeded by heat, and this accompanied by drowsiness and even by delirium. On the third and fourth day a redness shows itself in some part of the person. At first, this is not very distinct, and the line which separates it from the surrounding parts not very well marked; but it gradually spreads in all directions, and as it advances, becomes more prominent, and its outline more perfectly defined. When it attacks the face, the nostrils become swollen, tense, and painful, and the eyelids so much enlarged, as often entirely to obstruct the sight. In the majority of cases, perhaps only one side is affected; and then the boundary may be traced along the ridge of the nose, bisecting the lips, the chin, and the scalp. The distortion of the features, especially of the mouth, is among the most striking appearances. On examination with the hand, the morbid action is found to involve at least the whole thickness of the true skin, to which it imparts an unnatural hardness and a peculiar fleshy feel. At first, slight pressure causes the colour to disappear, which returns when this is removed. The parts first attacked, and the others in succession, begin to form blisters in irregular patches on the second or third day. The fluid effused is yellowish or livid, and oozes out through small crevices. On parts where blisters do not appear, the skin usually dries into fine scales, like those seen at the close of measles. The inflammation and accompanying fever usually continue from eight



to twelve days. During this time, however, the eruption trails along gradually and successively over different parts, so that the process in a given part is completed in somewhat less time: at length the disposition to spread ceases, and the disease subsides. The signs which indicate danger in this disease are the continuance or renewal of the delirium, and the occurrence of coma or torpidity from which the patient is with difficulty roused. These, however, do not necessarily indicate a fatal termination; for persons in advanced life often exhibit both delirium and coma for many days, and yet recover.

The treatment must vary with the condition of the patient. If he be accustomed to drinking or improper food, if nausea and dyspeptic headach be present, particularly if accompanied with a bad taste in the mouth, an emetic is proper, and should not be withheld by any fear of tendency to the head. One or two cooling and moderate purgatives are sometimes needed; but, in general, all very active evacuations are improper. When there is much prostration, the decoction of Peruvian bark, or a solution of quinine, may be given in such quantities as the stomach will bear. As external applications, great relief is often given by dusting the part with dry rye meal, and rags wet with lead water frequently have a happy effect. The watery solution of opium, so useful in erysipelas of other parts, is inadmissible in that of the face. The mucilaginous washes are seldom beneficial, and we have always found the much lauded unctuous preparations, decidedly injurious. In erysipelas which is advancing with rapidity along an extremity, its progress may often be checked by a narrow blister applied so as to surround the limb, over the line where the inflammation terminates.

The erysipelas of infants is a peculiar disease, which usually shows itself within a few days, sometimes hours, after birth; in fact, it is sometimes congenital. It commences ordinarily about the navel, and in its progress involves the lower part of the abdomen, the hip, thigh, &c. of one side. Vesication follows, and sometimes even ulceration of the parts; but in infants at the period just alluded to, the disease may prove fatal without reaching either of these stages.

Local erysipelas from wounds may occur on any part of the body, but most frequently follows on wounds of the scalp, and then assumes much of the character of general erysipelas, as already given.

*Poisoned Wounds.*—Erysipelas, occurring under these circumstances, is connected directly with the state of the constitution, and not with the local injury on which it happens to be engrafted; but in poisoned wounds, a peculiar order of symptoms depending on the poison itself is introduced. Some kinds

of specific virus introduced by inoculation do, indeed, engender diseases wholly different from erysipelas; but, at present, our attention is due to poisoned wounds, from which diffused inflammation of an erysipelatous character usually results.

The most familiar instances of poisoned wounds, are those inflicted by insects, such as the wasp, the hornet, the bee, the musquito, the field-spider, &c. All these have the power of inserting into the wound some peculiar fluid, capable of producing a specific effect. In the bee, this poison lies in a small bladder, situated at the base of the sting. When the bladder has been removed, the wound produces no more effect than a simple puncture. The poison flows from the vesicle through the sting, which is tubular, at the moment when it is inserted; and the mechanism in all other venomous animals is nearly the same. Generally, a sting by any of the smaller insects produces an inflammatory swelling, which subsides of itself; but this, in part, depends on the location of the wound. If the eye be stung, for example, very serious consequences may ensue. In constitutions of peculiar susceptibility, almost any of these stings may produce danger, and even death; instances being on record of the latter result, from the bites of spiders, and the stings of wasps and musquitoes. Death has followed in several cases within half an hour after the infliction of stings by single bees.

The treatment most strongly recommended is, first, if the sting be in the wound, carefully to cut off the poison vesicle therefrom; then to extract the former; next to immerse the part in very cold water, and lastly to cover it with cloths soaked in lead-water, or rub it with oil, poppy juice, or brine. If the inflammation is severe and extensive, local and general bleeding must be employed. We believe, at last, that the best local application is the childish one of cold wet mud.

The most severe poisoned wounds are inflicted by the scelopendra, the scorpion, the viper, the cobra di capello, and the rattle-snake. The mechanism by which the wound is inflicted, is much alike in all. The tooth itself is perforated by a cavity through which the venom flows. The bite or sting of these animals is followed by local pain, swelling, redness, and a rapid disorganization and effusion of the blood. These effects extend to the whole limb, and not unfrequently to the trunk of the body also. After a time, the pain abates, the part becomes soft and cold, and mortification supervenes. The general symptoms, in these severe cases, are prostration, anxiety, difficulty of breathing, and profuse sweats.

In the advanced stages the skin is cold; the pulsation of the heart scarcely perceptible; the stomach incapable of retaining liquid; and delirium soon supervenes. The bites of venomous

snakes, however, are very unequal in their consequences, their malignancy being greatly influenced by the state of the poison vesicle at the time, the part bitten, the constitution of the sufferer, the season, &c.: many persons escape with trifling inconvenience, while, in others, death may take place in a few hours.

In the treatment of the bites of poisonous reptiles, a great variety of nostrums have been recommended. Absorbent magnesian stones, the bruised leaves of several of our indigenous vegetables, certain roots used to deceive the vulgar by those arch rogues the snake-catchers of Bengal, &c. &c., have been highly extolled as specifics in the bite of the rattle-snake and cobra di capello.

We have spent much time in the investigation of the claims of these articles on the theatre of their employment, and are firmly convinced of their utter uselessness. Doubtlessly the claims of the Guaco, a plant which has recently obtained high fame on South American authority, will be found equally unfounded, but we have not witnessed its effects.

Instant excision and actual or potential cautery of the parts about the wound, are more plausible remedies; but the absorption or spreading of the poison is so rapid, that, if the case be dangerous, the disease will be extended beyond the reach of the remedy in a very few minutes, and the means for safely performing the operations proposed are scarcely ever obtainable so soon.

The popular method of applying a tight ligature round the limb above the swelling, is at war with every principle of good surgery and common sense. Our directions will be drawn from the well tried experience of intelligent American woodsmen, and some lights recently thrown on the history of absorption.

Dr. Caspar Pennock, of Philadelphia, has discovered that pressure on a particular spot, when sufficiently firm to arrest the circulation in the part, effectually delays the absorption of a poison until the pressure is removed; and, in the wounds under consideration, it is well known that the blood vessels which have felt the full action of the poison, not only pour out the vitiated blood from their extremities, but even permit it to flow into the cellular tissue through their coats. I have seen the arm-pit full of extravasated blood from the bite of a rattle-snake on the point of the elbow,—and the groin in the same situation, from the sting of a scorpion on the great toe.

When a patient, then, is bitten at a distance from home, let him instantly seek a pebble or a hard chip of wood of suitable size to make pressure on an inch or two of surface around the wound, and let him bind it exactly on the part, with great

tightness, with his handkerchief or the sleeve of his shirt, twisted, if necessary, with a stick, as directed in the remarks on the tourniquet in the section on incised wounds. If bitten on the finger or toe, let him arrest the circulation at once by ligature. Time will then be allowed for farther action.

No woodsman or traveller should be found without his tin or glass flask for drink, and his means for making a fire. If the former happen to contain a little whisky, it will be fortunate.

The next step is to light a fire, and heat the flask with a little liquor or water in it till the fluid boils. Then, quickly removing the pebble or chip, let the flask be emptied at once, but without agitation, and, while full of steam, invert it with its narrow neck over the wound. As it cools, it produces powerful suction, and the greater part of the poison, together with much of the vitiated blood, will be drawn into the flask. This plan will be found inapplicable in wounds of the fingers and toes; and here some good might be done by suction with the mouth, if the teeth and gums of the operator be in perfect order; but we would prefer amputation above the ligature, to the dangers of such an experiment.

We firmly believe that suction and amputation are the only local resources in these accidents. The former does not remove the poison entirely, and the system has still a struggle to go through, but one in which it always conquers, if the operation be rightly performed. If the means of suction are not obtainable on the spot, the patient must depend on the pressure till he arrives at a house. The rattle-snake bite is rarely fatal to stout adults, except in very warm weather, and the stings of scolopendræ and scorpions seldom terminate in death.

The general treatment of these accidents should be such as is adapted to typhoid fever, combined with that of erysipelas.

*Erysipelas Phlegmonodes, or Diffused Inflammation of the Cellular Tissue.* When erysipelas becomes epidemic, there is a strong tendency in all wounds and local injuries, whether caused by operations or accidents, to take on a peculiar form of the disease which is not confined to the skin, but extends deeply into the cellular tissue of the limb or part affected, involving, in many cases, even the fasciæ, and allowing nothing to escape, except the principal vessels, the nerves with their sheaths, and the muscles. This inflammation commences at the wound, pursues the usual course of erysipelas, so far as the skin is concerned, and is attended with a typhoid fever, in which the symptoms in the head are much



less marked than in erysipelas of the face, delirium seldom appearing until toward the last, in fatal cases.

The cellular membrane, in the mean time, passes on to supuration, without much pain, and as nature makes no attempt to circumscribe the pus, or form a regular abscess, except, perhaps, an imperfect and inefficient one whenever the disease in its regular progress approaches any one of the principal joints, the matter flows unrestrained through the cells of the cellular tissue, which soon mortifies most extensively, causing the part to feel doughy, or like a quagmire. The skin, retaining its vitality, ulcerates into rounded orifices here and there, to give exit to the pus and the sloughs of the cellular tissue, which may often be pulled out in masses like wet tow many inches in length! After a time, if the pus be carefully pressed out, we may often look down through these holes upon the muscles and great blood vessels of the limb, dissected clean by the mortification of the tissue! Yet even this horrible disease, when properly and carefully treated, will generally yield to medicine; and the patient then recovers without permanent deformity—the cellular tissue being regenerated!

Surgeons have it in their power to limit very much the progress and danger of this disease, by making long incisions through the skin at the time that the pus begins to form, but few patients will submit to the remedy. When necessary, the holes in the skin should be freely enlarged, to give exit to the pus and sloughs, and as the spreading of the matter is the chief cause of the mortification, great care should be taken to fix the part in such a position as to drain off the fluids, and to apply light bandages above and below the inflamed portion of the skin, to prevent the pus from percolating farther. In other respects, the local treatment resembles that of common erysipelas; the watery solution of opium being one of the best applications, and poultices of all kinds being inadmissible.

The general treatment is similar to that required in typhoid fever, and exhausting discharges of pus; but an occasional addition of five grains of calomel will be found highly serviceable in correcting torpidity of the liver, which is almost always present. The violence of the disease is generally over, in from fourteen to eighteen days, but the discharge and debility may last for months.

*Inflammation of the Veins and Absorbents.* After slight punctures, burns, bleeding, pricks from the knife in dissection, &c. on the upper extremities, we sometimes see considerable erysipelatous inflammation about the wound, followed, in a few days, by burning pain extending to the elbow or arm-pit—and long red lines running from near the wound toward

the same parts. If the disease continue, the glands of the arm-pit swell and become extremely sore; and when the red lines, which are thickened, hard, inflamed, and exquisitely tender, have reached the elbow, or, if commencing there, the shoulder, a violent and most dangerous irritative fever supervenes. At each joint reached by the inflammation, which is chiefly seated in the absorbent vessels or the veins, diffuse inflammation of the cellular membrane and more or less erysipelas appear. An attempt is then made to arrest the disease by the formation of an abscess; but this is rarely effected except at the arm-pit. The abscess, if formed, is not limited; and after passing the shoulder the pus is seldom checked in percolating the cellular tissue, till it reaches the middle line of the body—as in common erysipelas.

The great object in the local treatment of these often terrible cases, is to bring about resolution, and prevent the formation of pus. Of course, no unprofessional man would have the rashness to tamper with a disease of this character which frequently terminates mortally in from five to fourteen days, unless in situations where it is quite impossible to obtain medical advice. To meet such exigencies, however, we will venture upon a few remarks.

If the patient be not too much debilitated by intemperance or previous disease, the lancet may be used, with caution, at the onset of the fever. A bread and milk poultice, dusted with opium, must be applied immediately to the wounds. If leeches be procurable, they may be employed freely over the inflamed lines, carefully avoiding the neighbourhood of the erysipelatous blush about the joints. If cold applications be agreeable, use them to the same parts with the same caution. After these measures, and such general treatment as is adapted to continued fever, (see the appropriate subsection,) have, in some degree, diminished the pain, apply a blister over the termination of the red lines, including the bend of the neighbouring joint. If, notwithstanding these efforts, there is evidence of erysipelatous inflammation of the arm-pit and side, and a threatening of abscess there—the case will probably terminate mortally, in the absence of an experienced surgeon. If the patient survive till pus is fairly formed, open the abscess early and freely, and endeavour to prevent the subsidence of the pus toward the hip, or back, by compresses or suitable bandaging. At this stage, the fever is decidedly typhoid, and the exhaustion from the enormous discharge is terrible. We cannot do better than refer the reader to the latter part of the subsection on continued fever, and on the termination of inflammation in suppuration, for the little light which can be thrown upon the general treatment in addressing those who are not of the profession.

## SECTION IV.

*Diseases of the Respiratory Apparatus.*

*Catarrh.* The symptoms of a common cold are too well known to require any description. Its usual causes are a sudden change of temperature, partial exposure to strong draughts of air, or to a cool and damp atmosphere; but it often makes its attack without obvious reason. In its nature it is a mild degree of inflammation, generally commencing in the mucous membrane of the nose, and its accessory cavities, and gradually extending through the fauces to the larynx, and often to the whole length of the air passages. Its tendency is to produce superficial effusions, or an increased and vitiated secretion of the natural mucus. When confined chiefly to the larynx, fauces, and nasal cavities, its effect is scarcely sufficient to produce much febrile reaction; but when the whole or a considerable part of the air passages are involved, it makes up in extent for its deficiency in violence, and the symptomatic fever is often quite severe.

Still, in itself, catarrh is very rarely a dangerous affection, becoming so, only in consequence of its effects in calling forth any latent tendency to other serious affections, such as consumption, scrofula, &c.

In one form catarrh becomes epidemic, and takes the name, of influenza. The history of the rise and progress of the several great influenzas (for they have been somewhat numerous) is a matter of great interest, but our limits compel us to omit it: suffice it to say, that the progress of the disease is infinitely too rapid to be caused by contagion, and both its universality, and the impossibility of certainly shunning an attack by extreme care, disprove its dependence directly upon any atmospheric vicissitudes of temperature or moisture. Though these ordinary causes of catarrh may hasten the attack, and heighten its violence, the source of influenza lies buried among the mysterious agents which probably produce all the varieties of epidemic disease. Influenza probably destroys more lives than the plague, though secretly; for it calls into action all lurking tendencies to consumption, scrofula, and other chronic diseases, and while apparently immolating few victims itself, it obviously swells the bills of mortality through the agency of other diseases, for one or two years after its breath has passed over the land.

There is a peculiar form of chronic catarrh, the obstinacy of which depends upon a dyspeptic condition of the stomach.

It yields only to the remedies appropriate in that complaint. There is also another, peculiar to elderly people, being an habitual cough, accompanied with loose expectoration, occasional hoarseness, and increased secretion in the nose and fauces. This, it is considered dangerous to cure, but it is much relieved by a course of stimulating treatment, the reverse of that which is employed in a common cold.

In common catarrh, active or severe remedies are seldom needed. It is a common impression that a hot beverage taken at the outset of a cold, aided by rest in a warm bed, will bring on perspiration, and cure the cold. In all mild cases, the first of these effects will generally follow, and as no evil can result from the trial when there is scarcely any fever, the plan appears worthy of a trial. It is indeed natural to suppose that as suppressed perspiration often causes the disease, restored perspiration should relieve it; and the rule is found true to a certain extent. If the first intimation of approaching catarrh—the first tickling sensation in the nostrils—were to be met by increased protection of the person, a draught of hot mint, or other mild tea, or even a brisk walk, the disease might be successfully combated in many cases. But nature is not to be interrupted in her processes at all times, or under all circumstances; and, having adopted a particular mode of counteracting a morbid impression, she cannot be expected to abandon this, at an advanced stage, for one offered by art. Hence, our sudorifics often fail in producing the desired effect. In respect to the more simple articles employed in this way, being always harmless, their failure need not be dreaded.

But of the stimulating compounds prepared with brandy, or other alcoholic ingredients, this is far from being true. They may not only fail in curing, but may aggravate the malady.

Hot lemonade, or some simple infusion, therefore, will be found a far safer remedy. There is reason to doubt whether the production of a sweat depends very materially on the heat of the beverage. When the body is well protected externally, cold drinks excite the surface as readily, and, when there is much fever, more readily than such as are warm. In the far west, where the processes of the healing art are conducted somewhat summarily, we have been told that it is common to cure a cold by covering the body with buffalo-skins, placing the feet opposite a good fire, and causing the patient to drink cold water. There is much good sense in the plan, and it can hardly fail to prove salutary. One of the best and most powerful sudorifics, after fever has supervened in bad colds, is a weak, hot infusion of bone-set (*Eupatorium perfoliatum*.) A full pint should be drank at bed-time, and as hot as possible.



There is, usually, even in cases of a mild character, a perceptible aggravation of the symptoms toward evening, marked by a slight creeping and chilliness, which sufficiently indicates the propriety of caution in regard to exposure at that period of the day. If the fever run high, the depletory measures, recommended in the commencement of the continued fever, come into play, and as a febrifuge, ten drops of antimonial wine, with thirty drops of sweet spirits of nitre, may be given every two hours. Inflammations of the throat, when they supervene, may be treated like other inflammations where resolution is desired, but cold applications are not admissible. (*See Terminations of Inflammation, Resolution.*)

Parents often consider it necessary to keep their children at home from school and play (it may be, against their inclination) for colds too trivial to require such attention, and which are rather aggravated than relieved by the precaution. The clear open bracing air of a winter's day is far more beneficial, as well as more grateful to a catarrhal patient, than an atmosphere heated and dried by a glowing fire of anthracite coal.

*Influenza* is a febrile disease accompanied by inflammation of the fauces, all the air-passages, and, to a greater or less extent, the substance of the lungs also. The principal symptoms, in addition to those of catarrh, are great hoarseness and wheezing, a rapid pulse, hot skin, sickness of stomach, and headache. The fever is usually regularly remittent, but sometimes assumes an irregular intermittent type. In some particular epidemics, many patients have sunk into collapse in a very few hours; and the disease has been attended with cramp, most painful cough, extreme debility, and delirium. But, in fact, the character of this epidemic, like all others, varies considerably at each succeeding attack. It is sometimes very mortal among the robust; but if the more delicate succumb, it is generally at a later period, from other diseases engendered by the complaint. Women and children usually escape with a lighter paroxysm.

As the nature of the disease is intermediate between a common catarrh, and a lung fever, the application of a little discretion and intelligence, to the practical directions given under these heads, will serve as a better guide in the treatment, than any rules which could be given here.

For the relief of cough in the active forms of catarrh, when mild, any of the lozenges which contain no laudanum or opium in the crude state, may prove serviceable; and in the chronic forms and later stages, when protracted, the opiate lozenges and the brown mixture are useful. In the catarrh

of old men, the following expectorant mixture has been found to give much ease.

Gum ammoniac,	-	-	-	-	one drachm,
Gum Arabic,	-	-	-	-	half an ounce,
Antimonial wine,	-	-	-	-	one drachm,
Hartshorne's acetic tincture of opium,					one drachm,
Pure water,	-	-	-	-	six ounces.

Rub these ingredients together in a mortar, until they form a milky mixture.

**Dose.**—A table spoonful three times a day. The sirup of squills, in table spoonful doses, occasionally, is also serviceable in protracted cases among adults; but we think it increases the susceptibility to disease of the throat in young persons.

**Pleurisy.**—An attack of pleurisy is marked by acute pain in some part of the chest, most generally referred to that part of the side which corresponds to the sixth or seventh rib, about midway of its length. The pain is sometimes heavy and dull, sometimes acute; but always aggravated by a full breath, which, therefore, the sufferer most carefully avoids. When a full breath is taken, it induces cough, which, for the most part, is short and dry. The ordinary breathing is unaccompanied with soreness or pain, at least, until the distention of the chest arrives at a certain point. The pulse is hard and frequent, but the other symptoms of fever are not generally very strongly marked.

It is certain that a disease attended with these symptoms often exists, and is relieved promptly by a full bleeding, or finds spontaneous relief occasionally in sweating; and it is exceedingly probable, if not quite certain, that the seat of disease, in these cases, is the pleura or investing membrane of the lungs. That we have not more direct evidence on this point, arises from the fact, that these symptoms admit of speedy relief, and rarely prove fatal, unless accompanied by others which mark affections of the substance of the lungs. Doubt has been thrown on this subject by the circumstance, that when cases of lung fever, which have never exhibited these symptoms of pleurisy, have proved fatal, the pleura has been found, on examination, to participate in the disease. Effusion into the cavity has been discovered, and in many instances the two sides which form the cavity have been found adherent. How can we reconcile this process, which seems to imply a high degree of inflammation, with the absence of the violent and acute pain and the other symptoms above described? Many plausible answers might be given to this

query; but the question not being of practical importance, we shall not discuss it. The distinction between pleurisy and lung fever is sufficiently obvious; but it is much more difficult to decide, whether the pain in full respiration, the hard pulse, and the short dry cough, may not be owing to a cause exterior to the pleura itself, and situated in the intercostal and pectoral muscles; in other words, whether they may not be rheumatic in their character. In general, the presence or absence of other rheumatic symptoms, as pain in the movements of the arm and shoulder, will help to decide the question; and there is a peculiar position in which, if the pain be muscular, the patient will be likely to complain: viz. standing upright on the foot of the affected side, the other leg being bent and resting on the toes. This position braces the whole side, and tests the soundness even of the intercostal muscles. After all, this distinction is of secondary importance, for even in a rheumatic inflammation so severe as to be confounded with acute pleurisy, the treatment appropriate to acute pleurisy would be demanded.

We have already said, that in this disease the symptoms may often be promptly relieved by a full bleeding, without any additional remedy. It is usual, when relief from this source is not complete, to follow up its effect by a blister and an active cathartic. To these remedial means little can be added.

*Lung Fever.* The signs of lung fever are acute pain in the breast, with lassitude, and loss of appetite, accompanied usually with chill, and, sooner or later, with pain or sense of tension and weight upon the part. The chill is followed by great heat, and presently an acute and pungent pain attacks some part of the chest, more frequently the middle of one side, extending to the collar-bone, and even to the shoulder. The breathing becomes frequent and short, with a hard, oft repeated, and painful cough, and an expectoration of frothy or viscid character, becoming tinged with blood or having this appearance from the first, sometimes, however, green or yellow, and even in some severe cases wholly wanting. The indication from the pulse is uncertain: sometimes this is hard, full, frequent; sometimes frequent but soft; sometimes not exceeding the natural standard, or even slower; and sometimes intermittent. The action of the heart is strong, and often accompanied with a sense of heat and burning. The countenance is flushed, somewhat tumid, and the lips dark and livid; but sometimes there is general paleness and a contracted aspect, marking a collapse. There is often an abundant and viscid sweat about the face, neck, and breast, while other parts of the body continue hot

and dry. The thirst is intense, with dryness of the tongue and throat, and difficulty in the act of swallowing. Answers to questions are uttered with hesitation, and with frequent interruptions. In regard to position, that on the affected side is generally preferred; but sometimes, the only posture which is at all tolerable is that on the back, with the head and shoulders elevated.

The symptoms heretofore enumerated may be considered as common to all well marked cases: there are others which belong only to the most severe, and may be considered as indicating a fatal termination. Such are, extreme redness and prominence of the eyes; swelling of the tongue; stupor or delirium. With these, in fatal cases, the usual precursors of death are manifested in about seven or ten days.

A favourable termination is brought about in different ways. Sometimes bleeding takes place from the nose, by which, without other apparent evacuation, effectual relief is obtained. More generally, the secreting surfaces of the lungs themselves pour forth an increased quantity of matter, varying from the tough glairy character of the ordinary catarrhal sputa, to the consistence of true pus. Most frequently, these two kinds of discharge are mixed, the mucus serving as a tenacious vehicle in which the purulent matter is enclosed. The tinge of blood in the sputa often alarms the patient or his friends; but it is merely an effort of the small vessels on the surface of the pulmonary passages to relieve themselves of distention by pouring forth their contents. By this expectoration, the difficulty of breathing and pain are relieved, and the violence of the fever diminished. Sometimes it happens that no considerable discharge takes place from the lungs; but, in place of this, there occurs on the seventh, ninth, or twelfth day, a profuse perspiration, pouring from the whole surface; while the urine deposits a copious pus-like sediment. Sometimes, again, without either expectoration or sweat, the disease has been dissipated by unclouded urine, secreted in uncommon quantity, amounting in some instances to 12 pints in a day!

Another direction is often given to the progress of pneumonia, by the formation of an abscess in the substance of the lungs. Why this should happen in a part communicating by so many passages with a natural outlet is not easy to say. The abscess thus formed may either discharge itself into the cavity of the pleura, forming an *empyema*, or it may open into the air passages, and thus be expectorated. The occurrence of empyema has sometimes been detected during life, and the matter discharged by puncture. In some rare cases the opening has taken place spontaneously. When the abscess forms a com-



munication with the air cells, a large amount of pus is at once discharged by cough. The subsequent history of these cases varies according to the strength of the constitution, the existence of any tendency to consumption, and other circumstances. When recovery takes place, the discharge gradually lessens in quantity, and becomes of thinner consistence, the abscess gradually healing and contracting. When the system wants vigour to effect this result, the discharge continues, hectic fever is developed, and the disease assumes the character of pulmonary consumption.

At the first onset of the disease the lancet is indicated, particularly if the combination of the symptoms with those of pleurisy afford reason to believe that the pleura participates in the inflammation. Where this is not the case, if the pain in the chest and difficulty of breathing be considerable, the pulse full and hard, and the access of the fever accompanied by intense pain in the head, blood should be drawn from the arm to a sufficient extent, if possible, to afford immediate relief to these symptoms. If the pain is distinctly referred to one side, and to a surface of limited extent, it will be proper immediately after the bleeding to apply a blister to that spot. The size of the blister may be from 36 to 48 square inches for an adult male, and in proportion for a younger or feebler subject. If in the course of three or four hours, acute pain in the head be manifested, and particularly if nausea be present, an emetic may be administered; for it is by no means uncommon that pneumonia is dependent in a great degree on previous imprudence and irregularity in diet. A debauch, for example, combined with late hours and exposure to night air, is one of its most frequent remote causes.

Even under other circumstances, a condition of the stomach demanding an emetic may be inferred from the presence of intense darting pain in the forehead, accompanied by nausea.

The employment of emetics in pneumonia has another advantage. It is one of the most powerful means of bringing on decided perspiration, and as this is among the modes by which the disease is spontaneously relieved, we have a strong argument in favour of imitating it by art.

The principal remedies, therefore, which are to be relied on at the outset of this affection are bleeding, vomiting, and the application of blisters to the chest. Of these, bleeding, when employed at all, should always take the lead; vomiting should be resorted to, only when, after bleeding, headach continues, or other evidence is afforded of what is usually termed a bilious state of the system; and the blister may be omitted when the pain in chest and soreness in respiration are either mild or absent.

After the first 48 hours of the disease have elapsed, the prospect of terminating it by any immediately debilitating action on the system will be so far diminished, and the powers of the frame so much exhausted, as in general, to forbid the use of remedies in this view. The object now is to favour expectoration from the passages of the lungs: for this purpose, various articles have been recommended under the name of direct expectorants. Of these the most efficacious, if, indeed, any of them can be depended on, is undoubtedly the squill. But a class of medicines which have been much more relied on for this purpose, are those which produce more or less nausea or inclination to vomit. The vast amount of secretion from the lungs which precedes and follows the action of an emetic, is matter of familiar observation; and this observation has been turned to account by giving to patients under lung fever small doses of antimony or ipecacuanha, enough to produce sickness without provoking actual discharge from the stomach. Employed with discretion, this class of remedies will do good; but they are too uncertain in their operation to be the subjects of specific rules, and too powerful to be safely trusted in the hands of the inexperienced. To those, therefore, who, without regular medical education, are obliged to treat this stage of pulmonary inflammation, we can offer no better advice than to regulate the external circumstances of the patient on principles already laid down under the head of fever; to give warm diluent drinks prepared with barley, gum Arabic, slippery elm, &c., to apply a blister, should local pain or soreness recur, and to alleviate the annoyance suffered from cough at night by antispasmodics or opiates. By combining squills, ipecacuanha, and opium, in the proportion of a grain of the first two, and half this quantity of the third, in powder or pill, a preparation is formed which is at once expectorant, diaphoretic, and anodyne, and which will generally relieve, for three or four hours, that tedious and hacking cough, the occurrence of which, during the hours of sleep, is among the most troublesome attendants on the disease.

The serious objections to opiates are, that the sleep they procure, if much fever be present, is not refreshing, and that their action is not favourable to the due performance of digestion, and the regularity of the evacuations. The first objection is met, in some degree, by combining the opium as above mentioned; and sometimes more successfully, by substituting for it a fifth part of the same quantity of the morphia. The second evil must be obviated by a judicious employment of aperient medicines.

*Consumption.* We have above noticed the manner in which common inflammation of the lungs appears to termi-

nate in consumption. Probably, in most cases of pneumonia, which take this course, there must have existed, previously to the occurrence of the disease, the peculiar structural derangement which predisposes to phthisis, which consists in the presence of certain soft, yellowish bodies, called tubercles, or of a grayish substance, which is capable of assuming the same general character. It appears that in every fatal case of true phthisis which has been examined after death, one or both of these appearances has been found.

A great proportion of the cases of consumption develop themselves without severe inflammatory symptoms, and arrive at full maturity almost without the subject of them suspecting that he has had any serious disease. The commencing symptom is a slight and short cough, which soon becomes habitual; but which is so little remarked by the patient, that, if asked the question, he will unconsciously deny having any cough whatever. In answer to more particular inquiries, he acknowledges that he has had a slight cold, but believes himself to be wholly rid of it at present. It may be observed, however, by a little careful attention, that the breathing is easily hurried by motion, that there is some emaciation, and a diminished disposition to any active effort. This state may continue for a year or two, without any other complaint on the part of the patient, than that he is more liable to take cold than formerly, and that cold produces cough. These aggravations may still prove temporary; relief may be procured, and no alarm or anxiety experienced. It is often observed, however, that on some of these occasions, the cough is troublesome on the patient's lying down at night, and continues longer than in ordinary catarrh.

The cough, thus increasing and remitting, is often unattended, for a long time, by any expectoration whatever. But when, at length, it becomes more constant, it is attended with the raising of phlegm from the lungs, especially in the morning. The discharge by degrees alters its appearance, becoming more abundant, less transparent, and, at length, yellow or greenish; finally assuming a purulent, or, as the popular term is, corrupted appearance. But neither at this, nor any other time, does the matter thrown up, resemble pure unmixed pus. More or less mucus, or viscid white phlegm, is mixed with it, and seems absolutely requisite, in order to enable the muscles concerned in the act of coughing to effect the expectoration.

As these changes advance, the breathing becomes more difficult than before, and the emaciation and weakness increase. Many of the natural secretions are now checked; and females, particularly, perceive a change of system, which is, in reality,

the effect of the pulmonary disease, though often regarded by themselves as the cause of the cough.

Up to this period, the pulse may not have been materially affected; but feverish symptoms now begin to manifest themselves by the occurrence of a slight chill, or, at least, a feeling of chilliness toward evening. This is the commencement of hectic fever. It is soon found that the fever observes its regular periods, and that two paroxysms occur in the course of every twenty-four hours, with equally well marked, though somewhat different symptoms. The morning fever comes on about noon, the patient at this time experiencing rather heat than chill, with a flush in the cheek, which, as the disease advances, becomes one of its most striking characters. Some remission then follows; but in the evening, another paroxysm succeeds, in which the cold stage is decidedly predominant, so that the patient always requires an increase of clothing. This chill is followed, particularly towards the termination of the disease, by very abundant sweats, which, however, are never accompanied, and rarely preceded, by any sensation of warmth. These night sweats, as they are called, form another of the prominent marks of consumption. They increase in amount with the advance of the disease, and become very profuse toward the termination of fatal cases. In the progress of the affection, pain in one or other side is felt and becomes nearly constant: this is aggravated by cough, and in particular positions of the body. Spitting of blood is another symptom, which always shows itself in the course of the disease, though it does not always attend its commencement. As the case approaches a fatal result, the tongue is observed to become peculiarly clean, red, and shining; the eyes assume a pearly lustre, and the feet swell. Still later, the mouth becomes affected with aphthous eruption; and an obstinate looseness of the bowels, which rapidly exhausts the strength, makes its appearance.

It is not the mere existence of tubercles in the lungs that constitutes consumption; for these have been found after death, in a large number of cases, in persons who have died of other diseases. It is, in fact, the morbid development, the inflammation and suppuration of the tubercle, which gives rise to consumption. Two objects, therefore, present themselves as practically important: first, to ascertain the existence of tubercle, and secondly, to guard against its development in phthisis. Of the hereditary transmission of consumption, no doubt is now entertained; and in examining the lungs of children born of consumptive parents, tuberculous formations have, almost always, been observed. Again, tubercles are common in scrofulous subjects; that is, in persons who, when children,



were remarkable for a florid complexion, thick upper lip, and a tendency to swelling of the glands of the neck. But although these appearances, and others, which might be mentioned, may inspire a suspicion of the existence of tubercular matter, they do not justify any very decided measure to prevent its development. It would be desirable that persons, evidently predisposed to the disease, should seek the influences of a climate, in which the exciting causes of consumption are rare or wanting; but as this evidently cannot be done in the great proportion of cases, the only remaining course for such persons will be to avoid those sudden atmospheric changes which are calculated to induce catarrh; to be reserved in indulgences, and cautious of exposure. How difficult it is for one enjoying apparent health, to follow such rules, we need scarcely say; nor how rarely such injunctions are obeyed or remembered. It is seldom, in fact, until cough, pain in the side, a suspicious expectoration and slight hectic are already present, that the sufferer begins to think seriously of his condition. From this time, a host of minor remedies are proposed and tried in succession, each with very transient good effects. Bleeding is tried, to reduce the inflammatory action; blisters are applied, to transfer the irritation; opium is given to quiet cough; digitalis to retard the pulse; calomel to alter the secretion; squills and antimony, to promote expectoration, and relax the exhalants of the surface. All these produce effects, more or less satisfactory, for the moment, and all are in turn abandoned, as soon as their real inefficacy, or the inconveniences which attend their action, are discovered: till, at length, the sufferer gives up all remedies in despair, and quietly resigns himself to his fate.

There is, in fine, no known cure for consumption. Yet certain it is, that cases have often proceeded to the stage of profuse night sweats, purulent discharge, and extreme emaciation, and have recovered. Dissection, in such cases, has usually shown that there were no tubercles; but instances have occurred in which the ulcerations of genuine phthisis have been found cicatrized.

Were it practicable, indeed, for the lungs to enjoy for a time that repose which is permitted to almost every other diseased structure, the process of healing, even after the evacuation of an abscess, would be comparatively an easy one; but as this is impossible, the next best mode of affording relief is to render the task which is allotted to them as easy as possible. This will depend mainly on two circumstances—the quality of the air breathed, and the quality of the blood to be acted on. The latter is principally dependent on the quality of the food taken, and hence one advantage of a light, easily digest-

ed, and nutritious diet. It is partly in this view that the exclusive use of milk as an article of diet has been proposed, and the result in many instances has been exceedingly favourable to the plan.

The regulation of atmospheric influence is at once the most important, and the most difficult part of the management of consumption. Changes from heat to cold, from dryness to moisture, and often the reverse, are found to aggravate the inflammatory action and increase cough. Hence the leading object of the sufferer and his friends is to place him beyond the reach of these changes, and render the medium which he inhales as uniform as possible. This, among us, is sufficiently difficult to effect at all seasons; but in our winter and spring months it becomes peculiarly so. One of two modes of proceeding must be adopted. First—To create and maintain an artificial temperature by means of fire, preventing as much as possible all unnecessary draughts of air; and, secondly, to seek a climate where the winter is so mild as to admit of constant exposure without danger. The first plan is so difficult and expensive, that it almost always fails. The success of the second expedient seems to depend on the stage of the disease at which it is adopted. Those who have resolution, at the first development of the characteristic expectoration and fever, to bid farewell to country and to friends, and submit to the inconvenience of temporary exile, will, if judicious in their choice, almost always find relief; while those who wait till the resources of treatment at home are exhausted, till cough, expectoration, and night sweats have reduced their strength to the lowest ebb—till three-fourths of the lungs are disorganized, and the remainder scarcely adequate to the performance of their functions, will too surely find that they have sacrificed the comforts of home without the prospect of an equivalent, and have turned their back on friends and kindred, only to find a grave in a foreign land.

*Spitting of Blood.* When blood comes from the throat into the mouth, and is thence spit out, it is a question of great interest to determine, whether it proceeds from the posterior nostrils, the throat itself, the stomach, or the lungs. The first case is easily distinguished, by the facility with which the patient can cause the blood to appear by blowing the nose. The second is not likely to happen, unless preceded by some obvious disease or inflammation of the part, and the question is easily determined, by ocular inspection. The signs of distinction between bleeding from the stomach, and that from the lungs, are, firstly. The former is usually raised by vomiting, and the latter by coughing. This test is not quite certain; for vomiting is usually attended by some cough, though the cough

by which blood is raised, is unlikely to be attended with vomiting. Secondly, the blood, when it comes from the stomach, is usually in larger quantity than when from the lungs. Thirdly, the blood from the lungs is usually florid, and mixed only with a little froth and phlegm; while that from the stomach is darker, and combined generally with other substances peculiar to that organ. Fourthly, vomiting of blood is not likely to happen, unless preceded by some marked affection of the stomach, and bleeding from the lungs is usually preceded by cough and other trouble about the chest. With these signs in view, it is not easy to make an unwilling mistake. The following remarks, though mostly applicable to both affections, will be especially applied to bleeding from the lungs, which is by far the more common and important.

*Pulmonary hemorrhage* is never salutary. Although the vessels of the lungs may be over excited, this mode of relieving them is too hazardous, and should therefore be checked as soon as discovered. In this respect the present affection is decidedly contrasted with bleeding from the nose, which, to a certain extent, should be permitted, or even encouraged, if preceded by decided symptoms of vascular fulness.

In active hemorrhage from the lungs, with a full bounding pulse, flushings, sense of constriction in the chest, &c., we must bleed at the outset, until the pulse is lowered, and the breathing is rendered more free. If the discharge continue unabated under this treatment, it may be considered as passive, and the astringent remedies become applicable. Not much confidence is to be placed in the vegetable astringents: of the mineral, the most trustworthy are alum and sugar of lead; but these can scarcely be ranked with popular remedies. An article much more employed than these, and one which is safe even in active hemorrhage, without preliminary blood-letting, is common salt. This has deservedly become a popular remedy when the services of a physician are not to be commanded. Its operations cannot be fully explained, but in many instances it produces nausea, on which its virtue may be in part dependent. It may be taken as rapidly as possible, in the dose of a teaspoonful or more repeated every ten or fifteen minutes, until four or five doses be taken, unless vomiting supervene. Another favourite remedy for hemorrhage, when dependent on general increased excitement, is the foxglove. It possesses the curious property of reducing the frequency of the pulse, provided the patient be kept, while under its influence, in a recumbent posture, or at least, without any change of position. It evidently produces its effect by acting primarily on the brain and nervous system, and is an article to be employed with great caution. Its effect, however, on hemorrhage, is often very marked and decisive,

even when the seat of the bleeding is at a great distance from the centre of the circulation. From fifteen to twenty-five drops of the tincture may be given to an adult, every two hours.

In speaking of hemorrhage from the lungs, we have had in view a real discharge of florid blood in some amount, and not the mere coloured sputa which appear under a variety of circumstances. To these coloured sputa, as appearing in pneumonia and phthisis, sometimes as a favourable sign, allusion has been already made.

*Asthma* has been well described as "a difficulty of breathing, recurring in paroxysms after intervals of comparative good health, and for the most part unaccompanied with fever." Again, asthma has been said to be "a disorder of the respiratory organs, characterized by remittent dyspnœa, the attacks of which generally return in the night, attended by circumstances which are noticed more or less in all cases where there is some obstacle to the mechanism of respiration." The last is not exact as a definition, but it is valuable as referring to some points, which ought to be kept in view in attempting to gain a distinct notion of this singular disease.

A paroxysm of asthma usually occurs during the soundest sleep, generally from midnight to two or three in the morning. The sleeper is awakened, after some struggling and convulsive movements, with a sense of impending suffocation, and of most painful constriction across the chest, which feels as if bound with cords. He is compelled immediately to sit erect, and in this position labours for breath in the most distressing anxiety. Frequently he flies to the window, where he sits or leans so as to inhale the air with the greatest freedom, regardless of any exposure. The breathing, mean while, is accompanied with a constant wheezing, the extremities are cold, the face pale or livid, the eyes staring, the heart palpitates, the pulse is weak and irregular. After these symptoms have continued for some time, cough occurs, with an effort at expectoration. The matter raised is sometimes merely a little frothy mucus; at other times mere viscid and heavy sputa, perhaps mixed with a little blood. In the last case, the expectoration usually proves critical, and is followed by relief. The ordinary duration of a paroxysm is from one to three hours. The frequency of attack varies, but a paroxysm like that above described, has been known to recur nightly for seven weeks together.

Few diseases have given rise to more discussion with regard to their cause and nature, than that now under consideration. We will express our views on the subject, with all modesty, in a few words.

The proximate cause of asthma appears to be a want of the proper change of the blood in the lungs, from the venous to



the arterial character, producing a demand for an increased supply of the purest air, which, during the paroxysm, is prevented from effecting its full purpose by some obstacle to the process of decarbonization, (*see Function of Respiration*), either mechanical or nervous. Hence embarrassment of the left side of the heart, to which the blood is not sufficiently stimulating to produce regular action. This disturbance of the circulation necessarily produces engorgement of the lungs, and hence the hurried respiration and sense of suffocation, which mark the attack. The exciting causes are all those mechanical and physiological agents which produce difficulty of respiration directly, by limiting the supply of air, or indirectly, by retarding the proper chemical changes of the blood in the lungs, when the air is present. Sleep renders the respiration slower and much less complete; it also lessens, probably in consequence of this, the rapidity of circulation and the vigour of the nerves. It tends then to limit the supply of air in one way, and to retard the changes of the blood in two ways, and is, therefore, one of the most powerful physiological exciting causes of asthma. Dropsy of the chest, empyema, ossification of the ribs, tight lacing, the sulphureous fumes of anthracite, the carbonic gases of this and wood, when burned in ill-constructed fire-places, dust, &c., &c., are mechanical causes of a diminished supply of pure air, and are exciting causes of dry asthma. Chronic catarrh, a very damp and warm atmosphere, sudden cold, the chilly stage of fever, &c., &c., produce engorgement of the vessels of the lungs, and are exciting causes of humoral asthma. Whatever weakens or disorders the pulmonary nerves which preside over the secretion of carbon from the blood, is an exciting cause of nervous or spasmodic asthma. Enlargement of the air cells, and what is called emphysema of the lungs, a common result of violent cough, and a constant attendant on severe asthma, is both a consequence and an exciting cause of all the forms of the disease.

Occasional attacks of asthma occur to persons of susceptible temperament, but in good health, from slight and singular causes. Asthma, even of severe character, is sometimes produced by the slightest odour of ipecacuanha; in others, by that of musk, roses, new hay, or even apples. We have seen a person of nervous temperament become asthmatic at the unfolding of a cambric handkerchief, and another, at any bustle or hurry among her attendants. The presence of a draught of air is a cause in some; and its absence, although the apartment may be perfectly ventilated, in others. A disease of spasmodic character, exactly corresponding to asthma, is mentioned among opium eaters, when deprived of their usual narcotic. The attack comes on with great violence, and unless

supplied with opium, the patient expires in the course of a few hours. In the cases above described, the term nervous or spasmodic asthma is justly applicable.

In a large proportion of the cases in which the disease is habitual, the resort to fresh air and free exposure seems to give the only relief which the circumstances allow. The phenomena of the fit, and the state of the lungs on which it immediately depends, would appear to point out the expediency of diminishing the force of the circulation; but the more powerful agents we possess for this purpose, such as blood-letting, nauseants, &c., do more injury by diminishing the muscular force on which the maintenance of the respiration depends, than good by lessening the force with which the blood is thrown upon the lungs. Nauseants, however, are occasionally resorted to, and in full habits, when the attack is violent, and threatens actual danger from suffocation, bleeding is decidedly proper. The latter can scarcely happen, except in the early attacks of robust subjects; for when the habit is formed, the fit is seldom fatal. Inhaling the fumes of tobacco, or the leaves of the thorn apple, (*datura stramonium*) is a favourite remedy with some. The latter is a powerful narcotic, and, when smoked, produces temporary nausea with general relaxation and reduction of the pulse. But it is a dangerous plant. A strong tincture of lobelia, taken in the dose of fifteen drops at the commencement of a paroxysm, has also been found to afford relief; but this is also a dangerous article.

*Angina Pectoris.* The disease, now generally known by this name, has only been distinctly described within a few years. Its first attack often occurs in taking exercise after a full meal. The patient experiences severe pain in the front of the breast, extending towards one shoulder, more frequently the left, and shooting downward towards the arm and hand. The pain is such as immediately to check his progress, and induce him, if walking against the wind, to turn round and rest. After a few minutes it subsides; but recurs again from time to time, the attacks lasting longer, and being accompanied with a sense of approaching suffocation. When once habitual, it is excited by the slightest muscular effort. Even coughing will bring on a paroxysm. In this way the disease may continue many years, the patient, during the intervals, being apparently in possession of tolerable health. So capricious, however, do the paroxysms become, that the dread of their approach is never absent. Every imprudence in diet, exercise, exposure to change of temperature and undue effort, is sedulously avoided; purges, tonics, mercurial blisters, bathing, and the host of uncertain remedies usually brought to bear on incurable disease, are

tried in succession, but to little purpose. The disease sometimes, but rarely, subsides spontaneously. More generally, the attacks recur with continually increasing violence, until, at length, in a paroxysm of unusual severity, overcome by pain, and struggling in all the agony of suffocation, the patient breathes his last. In most of those who have died of angina pectoris, more or less of structural disease of the heart has been traced, although the appearances presented by this organ have not exhibited any great degree of uniformity. The most frequent changes noticed have been ossification of some of the valves, a thickening of the walls, and dilatation of the cavities. Sometimes, however, the morbid appearances have existed in organs remote from the heart, and in other instances no organic change whatever could be detected. If the nature of the disease be thus obscure, its treatment has neither been uniform nor satisfactory. During the paroxysms relief has been occasionally afforded by emetics, sometimes by opiates; and in the intervals a course of tonics, with due attention to diet and regimen, has sometimes been found of service.

#### SECTION V.

##### *Diseases of the Throat.*

*Mumps.* This disease is an inflammation of the parotid gland. It is a hard, painful swelling, not extremely tender, appearing on one or both sides of the neck behind and over the angle of the jaw, not preceded by serious general disturbance, or producing much fever in its progress. The swelling increases till the third or fourth day, and then gradually declines. The best treatment is to give a cathartic, and leave it to run its course. When suddenly checked by art or accident, the disease is often observed to translate itself to other parts where it is more troublesome. It is most common in children, especially about fourteen years of age. When it prevails epidemically, adults are sometimes affected, and a first attack affords no protection against its recurrence.

*Quinsy.* Of the malignant quinsy, or ulcerative inflammation of the tonsils, sufficient has been said under the head of scarlet fever; for though it is by no means true, that this form of inflammation occurs only in connexion with the scarlet rash, yet the principles of treatment, applicable to it in this combination, are equally so when it appears in a separate form. Passing over this, therefore, we shall, under the present head,

consider only quinsy, properly so called, in which the inflammation tends, for the most part, to a phlegmonous or suppurative character.

It commences generally without previous fever. The exciting cause is cold applied to any part of the surface, and particularly to the neck when in a state of perspiration. At first, a sense of uneasiness is felt in the throat, which soon amounts to decided soreness, aggravated by every movement of those muscles which perform the act of swallowing. On examination, the tongue is found to be covered with white fur; the whole surface of the fauces is of a deep scarlet hue, and one or both tonsils so swelled, as to fill up, in whole or in part, the interval which ordinarily exists between them and the uvula. The examination, necessary to ascertain the condition of the throat can be easily made, when the patient, sitting opposite the light, opens the mouth as widely as possible, and draws the air slowly in. During this last effort, the tongue is necessarily depressed, and a view of the diseased parts is obtained. If this expedient does not succeed, the tongue may be depressed by means of a spoon, or any article resembling it in form. As the swelling increases, the enlarged gland encroaches upon the uvula, pushes it toward the opposite side, and renders the relation of the parts more difficult to discover: the difficulty of swallowing becomes extreme, and liquids, on which the attempt at deglutition is made, are forced into the nostrils. In extreme cases, breathing is also embarrassed; the voice, which in all cases is obscured, becomes nearly inaudible, and the countenance gives evidence of great distress. In this state of things, from the vicinity of the inflamed parts to the angle of the jaw, it often becomes difficult to separate the teeth to any extent. The natural relief is obtained by the bursting of the tonsil, and the discharge of the contained matter, which happens from the fourth to the eighth day. It does not always happen, however, that the tonsil suppurates, even when the disease is left to itself. Resolution may take place on the second, third, or fourth day, but if the symptoms have gone on actively beyond this time, suppuration may be deemed almost inevitable. When one tonsil has broken, it is very common for the other to take on the same action, but the disturbance of the system is generally less with the second suppuration than with the first.

No disease more easily becomes a habit of the system than quinsy, and it will then recur on the slightest exposure, or in a manner wholly unaccountable. Though a most distressing disease, it is rarely fatal.

In directing the treatment, regard must be had to the probability of termination by suppuration. In many cases this must be a matter of conjecture; but if the outset of the inflamma-



tion be peculiarly severe, if the disease be epidemic, and has been found in the great majority of instances to terminate in this manner, or if the patient have been liable to suppuration in former attacks, the chance of effecting resolution is small, and we should encourage the suppuration. In doubtful cases the same course will be advisable, for the following reasons. The class of remedies which promote suppuration, cause in general less pain, and induce less subsequent debility, than those which have resolution for their object; and while we have little evidence that the former throw any material obstacle in the way of resolution where there exists a tendency to it, we have reason to believe that the latter impede the designs of nature, and retard the result which they are incapable of preventing. Revulsive measures should therefore be employed with caution, and not continued when their inefficacy has once been fairly shown. These remedies are general and local bleeding, emetics, purgatives, blisters, and astringent gargles. The effect of gargles is so transitory, that little reliance is to be placed on them, except for temporary relief. One of the best is prepared by diluting good vinegar with an equal quantity of water, and adding honey or sugar. Of external irritants to the throat, the most popular is the volatile liniment, but we have always regarded the propriety of these applications as very doubtful. Purgatives and emetics, leeches when given in the early stage, are intended to act as in other inflammatory affections. Local blood-letting has sometimes been employed by applying leeches directly to the tonsil or by scarifying the part with a lancet. These measures, though highly effective, are not adapted to domestic use. Leeches, however, are frequently applied to the neck itself, and there are few situations in which such depletion is more effectual. Lastly, general bleeding may be carried to a considerable extent in cases where there is reason to believe that the disease can be arrested; but it is seldom advisable to repeat the operation, unless, after decided relief, there occurs a sudden increase of febrile symptoms, which evidently require prompt arrest.

The means of promoting suppurative action are few and simple. They consist, for the most part, in the inhalation of vapour from boiling water or vinegar, and fomentations or poultices to the throat. When the matter has formed, and the abscess does not readily burst of itself, it may be opened by the lancet; but sometimes the great swelling of the parts prevents the patient from opening the mouth sufficiently to render possible the artificial opening. In this case, if suffocation be threatened, it may be necessary to administer an emetic, which, by the agitation that it causes, often occasions the rupture of the abscess. In impending suffocation from rapid swelling of both

glands, in the commencement of the case, free and often repeated bleeding is sometimes our only resource.

*Croup.* The seat of croup is principally, though not solely, the trachea, a quantity of lymph being thrown out upon the inner or mucous membrane of this passage, which, hardening, forms a false membrane, and rendering the passage narrow, obstructs the breathing. Croup is most frequent in children, from the first to the fourth year, and plump, fat subjects are more likely to be affected, than those of spare habit. The disease occurs at all seasons, but especially at times when changes of weather are frequent. The decisive symptom, the shrill sound produced by the passage of the air through the wind-pipe, which, once heard, can never be forgotten, develops itself a few hours after the first embarrassment in breathing is perceived. If this sign be absent, the case can hardly be regarded as croup, though the term is often misapplied. Other marks of the disease are a hoarse sonorous breathing, and a husky cough, sometimes wholly dry, but, at others, attended with expectoration of a purulent matter, in which may be detected fragments of the membranous formation above named. The voice is sometimes, but not always altered. On examining the throat, it will be found of a deep red colour, and in the struggles of the child, a large quantity of pus will often be thrown up on the tongue. The disease, whether it terminates favourably or otherwise, is of short duration, often only a few hours elapsing before relief is obtained, or death terminates the case. When the crisis is favourable, portions of the false membrane are sometimes expectorated, but in other instances the sputa offer nothing peculiar. In the most dangerous stage or degree of the disease, there is often to be remarked a mottled complexion, or a circumscribed flush in the cheeks. The pulse is small and quick, the eyes prominent and blood-shot, the pupils dilated. Violent tossing alternates with lethargy according, to the difficulty of breathing. The immediate cause of death is either actual suffocation, or the exhaustion incident to the rapid breathing, the laborious action of the heart, and the imperfect supply of air. Frequently, some hours before a fatal termination, the little sufferer falls into a state of torpidity, and death is met with surprising tranquillity.

In treating croup, the remedies principally relied on, are bleeding, emetics, and calomel. Bleeding is employed, not only with the view of relieving inflammation, but likewise to diminish the engorgement of the lungs. Emetics, also, apart from their general effect, tend powerfully to effect a dislodgment of the peculiar secretion within the throat. Calomel has enjoyed a large share of confidence in croup; but it should never be employed by the unprofessional assistant.

In domestic practice, where medical advice cannot be instantly obtained, no time should be lost in waiting. Let the little patient be bled very freely at the commencement of the case, unless something in the constitution of the child render bleeding decidedly improper. Then give, to a child of three years or upwards, a tea-spoonful of antimonial wine, and repeat, if necessary, in half an hour. If the second dose do not produce vomiting, double its quantity or frequency, unless the case be very mild. Vomiting *must be induced*, and, if it appear not in three hours, the warm bath must be employed to promote it. The purpose is often accomplished with extreme difficulty, but when free emesis comes on, the patient, with ordinary care, is safe. The vomiting should be encouraged by warm drink, and the nausea should be continued for a few hours by giving a few drops occasionally. The dose for a child of eighteen months may be halved, and for younger children, proportionably diminished. All exposures should be most carefully avoided for several days. When the symptoms seem to linger long after the emetic, a blister to the throat will often give great relief. The hive sirups, and other lauded remedies for croup, do not generally differ essentially from the antimonial wine in their effects; but the article known as Cox's hive sirup, is a very neat and safe emetic for young children. A single dose of three or four grains of calomel at the commencement, is both safe and advisable.

The croup of adults, though resembling in many respects that above described, is of much rarer occurrence, and shows itself principally in those advanced in life, and of decayed or broken constitutions. It usually involves the epiglottis, and the other parts concerned in forming the voice. There is more or less soreness of the throat at the very commencement of the attack, accompanied with heat and difficulty in swallowing, but with little or no cough. The inflamed tonsils and pharynx soon become covered with lymph, and then pain begins to be experienced in the larynx and windpipe, speedily followed by difficult breathing, anxiety, and change of voice, but seldom with those suffocative paroxysms, which mark croup in children. Another difference is, that the exudation seldom assumes the character of a membrane. The expectoration, therefore, is seldom mixed with any solid matter, but consists principally of mucus or phlegm, and sometimes of pus. The disease is commonly fatal under any mode of treatment. It was probably this disease that terminated the career of Washington.

## SECTION VI.

*Diseases of the Abdomen.*

*Cholera Morbus* or bilious cholera consists essentially in the vomiting and purging of bile. This may commence as a sequel of ordinary vomiting, when the contents of the stomach have been discharged, but its irritability continues; or it may occur spontaneously without any known cause of irritation being present in the system. In either form cholera is especially the disease of a hot climate, and never develops itself in our own, except during the summer, or early in autumn.

The remote cause of cholera, therefore, is heat applied to the skin; and the immediate effect of this application is generally supposed to be stimulation of the liver, and increased secretion of acrid bile; but it may with equal reason be supposed, that the immediate effect of the over-excitement of the skin is to produce irritability of stomach and nausea, and that, this effect once produced, the secretion of bile follows as a consequence. Cold, or arrested perspiration, following exposure to extreme and long continued heat, is among the most frequent exciting causes of the disease.

The attack of cholera is generally sudden, the patient being roused from uneasy sleep or suddenly alarmed during the day by extreme nausea, and at once obliged to evacuate the stomach. In some cases, pain, acid eructations, and a sense of lassitude usher in the attack. In the order of events, the purging may precede the vomiting, but the reverse is usually the case. The matters rejected are, first, the undigested remains of food, if any, then bilious matter more or less mixed with mucus, and then purer bile, varying from its characteristic yellow to a green, brown, or black hue. The dejections either continue to be bilious, or change to a peculiar half watery discharge, which has been compared to the washing of fresh meat.

Spasms, first in the abdomen, and afterward in the extremities, are a frequent symptom, and under the combined influence of these causes, the strength is soon exhausted. If the case be violent, collapse succeeds, and death may follow in a few hours, unless the restorative power of nature, or the interference of art afford some relief.

The stomach is the primary and principal seat of this disease, and to this organ must the treatment be especially ad-



dressed; for if, by any means, its irritability can be relieved, the management of the bowels will cause little trouble. When the disease is seen at its commencement, it will be often sufficient to enjoin abstinence from those large draughts of water, which the thirst incident to the disease induces the patient to demand, but which are rejected as soon as taken, and to direct small quantities of warm aromatic infusions, such as those of mint, balm, chamomile, or horse-mint. But when the vomiting has continued for several hours; when the patience and strength of the subject are spent, and the more serious symptoms begin to manifest themselves, there is no longer any room for this inert treatment. The arrest of the vomiting is urgently demanded, and must be effected at all hazards. Opium, camphor, and alcohol, have each a peculiar control over the stomach; and a combination of the three, which is offered by the paregoric tincture in common use, will, in a large proportion of cases, be found efficacious. As subsidiary means, a cataplasm of mustard to the stomach and the feet, a spice plaster to the pit of the stomach, and the use of small quantities of iced water, or solid ice, are strongly indicated. With the ceasing of the vomiting, the intestinal discharges usually cease also; and so complete is the change, that it is often found necessary to administer a cathartic soon after the arrest of the disease; for which reason we prefer giving a dose of ten grains of calomel, as soon as the vomiting is lulled for half an hour, in every severe case.

*Spasmodic or Malignant Cholera*, though familiarly known in India, from time immemorial, has attracted attention in Europe and this country only within seven or eight years; but, as genuine cases of this disease were occasionally met with in this country prior to the epidemic attack, as others are still showing themselves in our large cities, and as it has once or twice threatened to become epidemic a second time, in certain sections of the country, a passing notice of it cannot be superfluous.

Spasmodic is distinguished from common cholera, by the degree of its violence and fatality; by the nature of the discharges; and by the greater degree in which the nervous system is affected. In place of the bilious vomiting and purging, by which the latter is distinguished, the former is marked at its onset by a profuse discharge in both directions of a colourless fluid, in which not a particle of bile can be traced, and which, from its peculiar appearance, has been compared to rice water. The cramp, which in the common cholera is an occasional concomitant only, and comes on some hours after the attack, is here among the earliest and most constant symp-

toms. The spasms, commencing in the muscles of the belly, attack in succession those of the thigh, legs, and feet, and afterwards those of the chest, arms, and hands. These cramps are fixed contractions of the body of the muscle, which is gathered into a hard knot with excruciating pain. In the course of a minute or two this relaxes; but it again returns or is transferred to others; so that the sufferer scarcely enjoys an instant of entire freedom. Sometimes the vomiting takes precedence, as in common cholera; but often the purging ushers in the attack, and in some of the more rapidly fatal cases, it is the only evacuation.

The collapse which sometimes occurs in the common cholera, as an immediate precursor of a fatal termination, is often the primary stage of the spasmodic disease. So sudden is its onset, that the patient is sometimes struck down, as if by lightning; passing at once from full health, to a state which may be compared to a living death.

The collapse of cholera is so profound, that all the functions of organic life appear to be nearly suspended. The action of the heart is feeble and irregular; the pulse cannot be felt; and, if a vein be opened, it is with the greatest difficulty that a few drops of blood are obtained. Spontaneous vomiting or purging may not be present; but if any liquid is swallowed, it is often immediately rejected. The whole surface presents a peculiar blue colour, and the hands and feet, when examined, are found shrivelled, yet damp, like leather, after immersion in water. The extremities are chilled and the eyes sunk; the tongue is cold to the touch; and a profuse cold sweat pours from the whole surface. Spasms are among the regular symptoms of this stage, becoming less severe, in most instances, as it advances; but although they often cease for some time before death, they not unfrequently continue even for an hour after life has departed.

The voice is a peculiar, husky, or hoarse, but feeble whisper, and the perfect self-possession with which the patient replies to questions in regard to his condition, coupled with the sepulchral tone in which the answers are conveyed, serves more than any other circumstance, to augment the horror of the scene. So complete has been the collapse, in some instances, that the vomiting, purging, and spasms, were all absent, and the whole duration of the disease has varied from a few minutes to a few hours. We have seen death occur, in one case, within five minutes after the attack, and in several others, within an hour. Even in Paris and New York, individuals were seized in the street, with retching, vertigo, &c., and before they could be conveyed to an hospital, or any medical aid procured, were found to have expired.

Even where the patient rallies from the state of collapse, the final result is not always favourable. A febrile stage, resembling typhus fever, often ensues, with loaded tongue, cool skin, torpor without sleep, and sometimes with delirium. This may terminate fatally, at the end of eight, ten, or twelve days.

Like all other epidemics, cholera has been most fatal at its commencement, and as it progressed has become more manageable; probably, because the most susceptible subjects were the first objects of attack, and the epidemic influence was more slowly exerted upon those who, by their constitution and habits, were best calculated to offer effectual resistance. Thus, the persons first seized have generally been the inhabitants of unhealthy locations, persons of irregular habits, and those already suffering under disease. When these have been swept off in great numbers, another class become affected, among whom all these predisposing causes are either absent, or exist in an inferior degree. Whatever mode of treatment, therefore, may have happened to be in vogue, during the prevalence of a mild epidemic, or when a severe one has expended its force, obtains credit for the time; and hence, the numerous and contradictory plans of managing the disease which have been advanced with equal confidence.

Without attempting even to enumerate these plans, we shall offer such remarks on the treatment as seem to us best fitted for the guidance of the domestic practitioner, when medical assistance cannot be obtained: remarks founded on considerable acquaintance with the disease, acquired in more than one hemisphere.

When cholera is ushered in by premonitory symptoms of diarrhœa, accompanied by occasional sinking spells, some lividity of the lips and nails, and frequently, wandering neuralgic pains, it is of the utmost importance to check these symptoms at once, and this may often be effected by very simple means: a little lavender compound, taken occasionally, and followed by half a tea-spoonful of paregoric elixir—or a table-spoonful of the camphor julep, (though the preventive powers of camphor have been most ridiculously, if not criminally exaggerated,) or a draught of strong mint tea, with a total avoidance of all food, except arrow root, the gruels, or panada, will generally succeed in twelve hours. Irritants are more to be dreaded than simple stimulants, and notwithstanding the low diet, a glass of good port-wine sangaree may be taken at dinner time, by those accustomed to wine. If these remedies fail in checking the diarrhœa, or if this discharge be very profuse, the following much more powerful prescription will rarely fail.

Take of,	Prepared chalk,	2 drachms.
	Powdered gum Arabic,	2 drachms.
	Pure water,	5 ounces.
	Mix them thoroughly in a mortar, and then	
Add,	Laudanum,	2 drachms.
	Tincture of Kino,	$\frac{1}{2}$ an ounce.
Dose—a table-spoonful every two or three hours.		

When the attack comes on, notwithstanding all our efforts, the practice must be much more energetic. If the vomiting be, as it almost always is, a prominent symptom, it may sometimes be checked by giving a table-spoonful of common salt, dissolved in a tumbler of water—half to be given at once, and the remainder, if the vomiting continue unabated, in thirty minutes. A small injection of some stimulant tea, such as the horse-mint, (*monarda punctata*,) if accessible, or the common garden mint, with two drachms of laudanum, will sometimes aid in checking the vomiting.

The moment that the efforts of the stomach are lulled, or if this result cannot be effected in an hour, then without regard to the discharges, give fifteen grains of calomel, mixed with just enough molasses to enable the patient to swallow it.

From the first, let hot bricks, or bottles of water, be applied to the extremities and the stomach, and if possible, have a light muslin bag or pillow case filled with hot bran, as a substitute for the bottles or bricks applied to the abdomen, which are managed with difficulty on account of their weight and form. Dry heat is greatly preferable to steam or moist applications. Administer also, a tea-spoonful of lavender compound, with an equal portion of paregoric elixir, every hour; let the patient chew slowly small pieces of ice, or if this be unobtainable, let him take frequently half a wine-glassful of the coldest water to relieve the urgent thirst; and endeavour to relieve the muscular spasms by strong pressure with the hand, as they occur.

When the patient shows a disposition to sink into collapse, mustard plasters should be freely applied to the wrists and ankles, and when the collapse is confirmed, a large one should be placed on the abdomen, over which warmth should be continued.

In mature collapse, the internal medicines should be omitted, and in their place a table-spoonful of brandy or old whisky, with not more than an equal quantity of water, and ten drops of laudanum, should be given every half hour. Five grains of calomel every twelve hours may also be continued throughout the case.

On the cessation of the discharges in the collapse, the laudanum should be omitted, but the brandy continued; and when the cramps disappear, the heat applied to the surface should



be moderated. On the first signs of low, muttering delirium, which, we believe, never occur until after the final arrest of the discharges, the course of treatment should be changed, and that adapted to typhoid fever substituted for it.

In those cases of instantaneous or very sudden collapse which are almost peculiar to tropical climates, wherein the pulse at the wrist is imperceptible at the moment of attack or within fifteen minutes thereafter—wherein, if fatal, death follows in from twenty minutes to twelve hours, and if the patient survive twenty-four hours, he is considered safe,—the collapse must be treated with still greater promptitude. A towel, dipped in boiling water, and very slightly cooled by evaporation, should be thrown on the surface of the abdomen as quickly as possible. It will seldom create a redness there! A drachm of laudanum should then be given, followed in ten minutes by a gill of brandy slightly diluted. The doses of brandy and laudanum above prescribed for the milder cases, may then be doubled, and continued till the pulse returns. A dose of twenty grains of calomel may be given at any convenient and early moment, and dry heat and mustard plasters liberally employed.

Recovery from these cases, where it occurs, is usually very rapid, and we have seen in several instances the sufferer, attenuated and with a loosened skin, still unretracted from the enormous loss of matter by the discharges, yet pursuing his usual avocations on the day succeeding the attack! Indeed, in contradiction to received opinion, we believe that the mortality among the cases of sudden collapse, when the practitioner can reach the patient before death, will be found less considerable under fearless treatment, than in more protracted cases.

Of course, these directions are intended for adults when the disease is epidemic, severe, and at its height,—and must be rendered proportionally more mild in younger persons, scattered cases, more moderate epidemics, and the decline of even the severest.

*Diarrhœa or looseness* consists in an increased frequency of the discharges from the bowels, the matter passed seldom varying from its usual character, except in becoming more loose and watery. Each evacuation is immediately preceded by griping pain, which is relieved by the discharge itself, and does not return, except with the succeeding stool. There is generally moderate, not extreme thirst; the appetite impaired, but not wanting; some tenderness is discovered on pressing strongly on the bowels, and an unusual accumulation of fluid can be perceived within their cavity. This disease is caused by external influences of less activity, but of the same character, as those which produce cholera; but it is more frequent in summer, and especially in autumn, when the alternate action of heat and

cold is aided by the abuse of fruits and crude vegetables. A slight increase of evacuations, produced by indulging somewhat freely in ripe fruit, is not to be regarded as a disease; but a very moderate disorder of this kind, when combined with the influence of atmospheric changes, or operating on an unusually irritable constitution, may give rise to diarrhœa; and hence, excesses which may be practised at one time with impunity, will, at another, produce serious results.

Diarrhœa, induced by exposure merely, may be regarded without impropriety, as a catarrhal affection; and we have already remarked, that among the modes in which catarrh of the lungs finds a natural termination, the transfer of the increased secretion to the alimentary canal is by no means the most unusual. Others, among less frequent causes, are certain affections of mind, as anger, disgust, and especially fear. In some persons, certain articles of diet, not generally injurious, will always produce it. It is a very common attendant on the process of teething.

The increased secretion from the coats of the intestines has undoubtedly a tendency to relieve pre-existing irritation, and therefore should not be too suddenly checked. On the contrary, it is often advisable to promote it, at the commencement, by some mild cathartic. For this end, a spoonful of oil answers perfectly well, or, perhaps still better, a few grains of rhubarb, which generally has an astringent after its cathartic operation. The effects of laxatives are somewhat various. Sometimes the discharges seem to be merely increased in quantity by them, without any change of character. More frequently, however, they check the disease until after the operation of the medicine, and this is especially the case when a slow cathartic, such as rhubarb, is exhibited. Sometimes the action of this last article, even in its common dose, is simply astringent, and the disease disappears, upon its administration, as if by charm. Even when the cathartic increases the discharge without changing its character, the disorder may cease spontaneously under proper regulation of the diet. Should it not do so, a grain of opium or twenty drops of laudanum may be given at night, and the cathartic repeated in the morning, if the diarrhœa continue. Even when the discharges are delayed by the cathartic, an opiate may be given, but is not often needed. The principal benefit of opium seems to be a check to the discharge of the secretion for a few hours, which prevents the necessity of rising during the night. Taken prematurely, and followed up as is sometimes recommended after every discharge, it often does unquestionable harm.

The more general but all-important means of controlling diarrhœa, are to be found in rest, attention to the clothing, and

regulation of diet. Bodily exercise must be avoided; a rule difficult to follow, while the disease is only felt as an occasional inconvenience, but one which is absolutely indispensable. The skin should be protected by sufficient clothing, of a character to afford security against sudden chills; for which purpose flannel is the best of tissues. The diet should consist almost exclusively of the milder vegetables. The morning and the evening meal must consist of tea, or the shells of cocoa, or boiled milk with bread. Rice, sago, tapioca, or the simplest meat broth should form the dinner, and it is better to take it at short intervals than as a regular meal.

Even after the disease appears to be checked, it is absolutely necessary to continue these precautions; for an imprudent exposure to the night air, a fatiguing walk, or a dinner, will often undo the labour and care of a week, or perhaps convert the disorder, from the manageable form in which we have hitherto considered it, into a true dysentery.

In addition to the above, which is the common acute diarrhœa, various forms of chronic discharges from the bowels are mentioned by authors, to which it will be sufficient to make very cursory allusions. One of these is termed *white looseness*, from the milky appearance of the dejections, which resemble lime-water. It occurs chiefly in persons in whom the functions of the liver have been much impaired by residence in a warm climate. It sometimes succeeds the bilious fever of our southern states, or is the effect of the combined action of external heat, and a stimulating diet. Though not rapidly fatal, it is cured with difficulty, and by repeated attacks finally exhausts the system.

There is a disease called *lientery*, in which the food passes through the bowels unchanged. Its proximate cause is increased irritability in the muscular system of the stomach and bowels, independently of the influence of cold, or any peculiarly irritating quality in the food itself. The food is not, as in diarrhœa, urged through the intestines because it is indigestible; but it is undigested, because the state of the intestines does not allow time for the nutritive juices to be absorbed. In *tubular looseness*, secretions from the mucous membrane, preserving a tube-like form, are thrown off.—The discharges of masses of fat, which are recorded in collections of medical curiosities, need only be mentioned. The common form of chronic diarrhœa, is serous or watery, and results frequently from the neglect of the acute form, which is allowed to become a habit of the system. The diarrhœa incident to the latter stage of consumption, and which always accelerates its fatal termination is ascertained to depend on inflammation and ulceration of the intestinal tube. The treatment of none of these varieties should be attempted by the domestic practitioner.

*Dysentery.* The characteristic symptom of dysentery, is an earnest desire to evacuate the bowels, followed by severe straining efforts, which expel a little of the mucus that naturally covers the surface of the intestine. This generally resembles a mass of jelly, is often mixed with blood, but always unmixed with any of the natural bilious discharge from the canal. This evacuation relieves the pain for the moment, but after no long interval, the same desire returns, and is followed by the same result. If, mean while, the true fecal matter is expelled at all, it appears in small, dry masses, which appear to have been retained for an unusual period. Continued fever, which is increased towards evening, accompanies the disease, and, with the increase of fever, the local symptoms are also aggravated. As the disease advances, the true mucous character of the stool is exchanged for one having rather the appearance of matter from an ulcer or open sore. The termination is various. Sometimes recovery is effected by a single remedial measure, sometimes after three or four days of treatment, and sometimes at the end of many weeks. When the disease is epidemic, and of severe character, the patient often dies with extensive inflammation; and, if neglected, the disease frequently passes into a chronic form.

The slimy and bloody discharges in this disease, are undoubtedly dependent on inflammation of the mucous membrane lining the bowels; but in what manner is the absence of the natural feces to be explained? By some, this has been attributed to a spasm or stricture of the large intestine, at its upper part, by which the feces are supposed to be mechanically prevented from descending; an explanation attended with some difficulties, and which we shall not stop to examine.

The tenesmus, or straining in dysentery, is one of its most striking symptoms, and shows how completely independent of any solid matter in the intestine, is the desire for evacuation.

A tea-spoonful of semi-fluid matter arouses the activity of the part when in this irritable state, even more than actual distention when the bowel is in health. This tenesmus, when the disease has continued for some days, becomes the cause of much pain and faintness, and at a later stage causes serious inconvenience, especially in children, by occasioning a protrusion of the mucous membrane or bowel itself.

The treatment of dysentery in its incipient stage, the only one which we propose to consider, is simple. If evidently the result of excess, if accompanied with nausea or other symptoms of deranged stomach, or if simply attended with fever and headach, an emetic will be highly proper; but this remedy is absolutely inadmissible when the disease prevails



as an epidemic. In these visitations the rules of ordinary experience cease to guide us, and it is often found necessary to omit remedies which, on general principles, seem decidedly called for. In ordinary cases the effect of an emetic, given at the invasion of this disease, is highly salutary, and often succeeds in arresting its progress. This may happen in various ways. In the first place, there is a stronger sympathy between the stomach and the rectum and colon, than between any intermediate portions of the canal; and whoever has attended a chronic disease of the lower bowels, must have observed that there is no other cause by which this disease is aggravated so quickly and certainly, as by the presence of undigested aliment in the stomach, and that there are often no means of relieving an attack so certain as that of emptying this organ. In persons predisposed to dysentery, it is frequently found to recur immediately on committing an imprudence in diet, and before the irritating cause can have passed beyond the stomach itself. Secondly, an emetic is often the most complete of all cathartics; producing evacuations in both directions, changing the whole secretion of the canal, and converting the existing affection into an artificial and very manageable form of cholera. Thirdly, an emetic is one of the most powerful sudorifics; and when the disease has arisen, as often happens, from suppressed perspiration, this affords a direct means of restoring the suspended action. Indeed, we know of no single remedy so likely, when administered at the very outset of the disease, to effect a complete cure; but where the case has been suffered to run on unchecked to the second or third day, we cannot recommend this mode of treatment with the same confidence. Bleeding, which is sometimes necessary, can only be employed safely with limitations which it belongs to the experienced practitioner to estimate. The remaining remedies are a cathartic and an opiate. Which of these shall enjoy precedence of the other, is a question often settled by convenience alone. If, for example, we wish to afford immediate repose, which is often desirable at night, fifteen grains of Dover's powder may be given at once, and even repeated in four or five hours, if the morbid evacuations recur. Opium, given in this way, does not interfere with the subsequent operation of a cathartic. Its effect is to diminish increased sensibility, and moderate the augmented action. Its influence in both these respects is more likely to be directed to the rectum, where both these derangements exist, than to the intestines above, which are already in a state of torpor. Hence we usually find that for some hours after an opiate, although the canal may be still unrelieved, the irre-

gular action is suspended. As a general rule, however, a mild aperient will be first administered. We cannot agree with those practitioners, however intelligent and respectable, who deny the expediency of giving cathartics at all, and advise that enemata alone should be trusted to for the removal of accumulations. This remedy is, however, a useful auxiliary in removing hardened feces, and is useful in other ways, if it be given in such quantity and of such temperature as to produce free perspiration, which it may easily be made to do.

Among the collateral sources of benefit in dysentery may be mentioned external warmth, which is as much needed and better borne in this disease than in cholera. Mucilaginous drinks, such as flaxseed tea, barley and gum water, mucilage of slippery elm bark, and of the pumpkin seed, are grateful, and do much good by lubricating the surface of the canal. The use of blisters to the bowels in the early stage is seldom needed; that of warm fomentations is highly advisable. The excoriation about the lower passage is a source of great annoyance, and is best relieved by the application of unsalted lard. Another troublesome, but necessary precaution in children, is to oblige them, from an early period, to allow the evacuations to pass from them in a recumbent posture. This will much diminish the straining. The last two directions belong to the treatment of the disease, if protracted; but they are addressed to the nurse rather than the practitioner, and may therefore be pardoned.

The after treatment of dysentery, and the management of the dreadful varieties of this disease often seen in hot climates and during certain epidemic attacks in temperate countries, are subjects on which we dare not give instructions to the popular reader; for the employment of the formidable measures necessary in some of these cases might prove, in his hands, more dangerous than the disease.

*Colic.* An intermittent, griping pain in the belly, principally about the navel, forms the general and leading symptom of colic. It is often met with as a concomitant of some of the affections elsewhere noticed, as of surfeit, flatulence, costiveness, &c. Viewed as a distinct disease, however, it embraces a frequent and important class of cases, to which the suddenness of the attack, the severity of the pain, and the necessity of prompt and efficient measures, impart peculiar interest.

We have said that the pain in colic was intermittent. The intervals, however, are of much less duration than in diarrhœa, and the disease is unaccompanied by discharges downward. The navel is generally retracted during the pains. There is vomiting, sometimes of undigested food, sometimes of bile;

and in the very severe cases called iliac passion, the contents of the bowels themselves are thrown up.

The causes of colic are, among others, the application of cold to the body when heated, long continued costiveness, the abuse of emetic and cathartic medicines, imprudence in diet, under the influence of mercurial or other medicines; opium-eating, the use of crude and indigestible vegetables, and excess in eating. The immediate cause is constriction of the bowels.

The objects in treating colic are, to remove the offending cause, to relieve pain, and to procure an evacuation from the canal. An emetic is often advisable, even if we are not perfectly certain of the presence of offending matter in the stomach. When there is nausea, sense of oppression, and headach, and no spontaneous vomiting has occurred, the necessity of an emetic may be regarded as unquestionable. When spontaneous vomiting has occurred, but the nausea and headach continue, the same remedy will probably bring away bile, and afford ultimate, though not very prompt relief. In these cases we suppose an offending matter to have been present; but even though the stomach may have been empty from the commencement, an emetic may still be of service by producing an increased flow of bile, and favouring the evacuation of the bowels. On the other hand, this remedy is decidedly objectionable when the action of the intestines is inverted, and a vomiting of feces is present; when the pain is extreme and demands instant relief; when vomiting has produced general exhaustion or collapse. Of the first of these cases, which is termed iliac passion, and constitutes the most dangerous form of the disease, we shall speak hereafter.

For the relief of pain, the most powerful remedial means we possess, are blood-letting and opiates. Where active symptoms must be checked at all hazards, there is no remedy, the effect of which follows so immediately as that of bleeding. In five minutes, it may often be made to produce fainting; in which state, for the moment at least, relief is certain. Another advantage of bleeding is, that it favours other evacuations. If employed when the stomach is full, unless this organ is peculiarly debilitated, it produces vomiting. It also promotes evacuation in the opposite direction, as is proved by the patient being often compelled, even in the severest cases of colic, to go to stool before the arm can be bandaged. It is the most powerful of all anti-spasmodics, and also favours sweating. Bleeding, therefore, in emergencies, is the most valuable remedy we possess. It is interdicted, like emetics, when continued vomiting has produced much exhaustion. Opium is a valuable medicine in colic, and frequently acts most satisfactorily in relieving both pain and spasm. It is particularly desir-

manded when an active bleeding has reduced the vigour of the circulation, and when nothing remains but an obscure sense of pain with a feeling of debility.

In the form of laudanum, or paregoric elixir, it often serves to relieve the vomiting, with which each return of the pain is sometimes followed. The last object is still more certainly effected by opiate injections, consisting of some warm mucilaginous liquid containing from twenty to thirty drops of the laudanum. The use of opium has been objected to, as tending to produce constipation, and thus to interfere with the subsequent operation of purgatives; but though opium tends to check the natural evacuations, yet this effect does not seem to be proportional to the dose; and after very considerable quantities have been given for the relief of pain or spasm, it is not found that cathartics act with much less force than before; sometimes, indeed, they act even more readily, for cathartics taken by mouth will not usually operate, until the pain and the irritability of the stomach are subdued. Cathartics, given by way of clyster, in any stage of the complaint, are often highly serviceable. In some of the most obstinate and protracted cases of constipation in colic, relief has been obtained by the gradual introduction into the rectum of large quantities of warm fluid, from four to five pints, for example, either uncombined, or with the addition of some oily ingredient. It is doubtful whether this remedy reaches the actual seat of obstruction; but the general relaxation of the whole system, evinced as it is by profuse perspiration, is sufficient, in itself, to explain the result. This simple expedient deserves to be tried, in every case where serious difficulty is met with in effecting evacuations. Among cathartics, the most proper in this disease are those which are most likely to be retained by the stomach; and this is especially the case with those which can be given in a liquid form, and possess a certain aromatic flavour. Even before the morbid irritability of stomach is wholly controlled, small quantities of some compound infusion, like that of senna, given at intervals and steadily persevered in, will often restore the bowels to their appropriate functions.

Among the less powerful auxiliary means, employed in this disease, are fomentations and blisters. The continued application of heat and moisture, will be found to afford very considerable relief, in many instances. External irritants, such as rubefacients and blisters, are not deserving of so much confidence. They require much time, and, when they fail, increase the suffering of the patient.

The form of colic, termed *ileus* or *iliac passion*, is distinguished by the inverted action of the intestinal canal, throughout nearly its whole course; so that apparently fecal matter



is actually forced upwards, and rejected from the mouth. The pain in this disease is severe, and the danger imminent. It is extremely difficult to determine the condition of the intestine during life. After the termination of fatal cases, one portion of intestine is sometimes found to have descended into and become enclosed by another; and, in some instances, nooses or knots have been formed by the bowels; the encircling portion being even drawn so tight as to produce strangulation, followed by gangrene. Our remarks on the treatment of this form of colic, are designed merely to prevent the domestic practitioner from doing mischief, by employing certain remedies useful in common colic, but fatal in ileus—it would be folly in the unprofessional to undertake any decided responsibility in the management of the latter, except, perhaps, to employ a few very obvious precautions. This disease almost always baffles the wisest, and nature may be more safely depended upon than the blind efforts of the ignorant.

Blood-letting, fomentations, and injections are, at least, as decidedly indicated in this form as in the preceding. Vomiting is of course forbidden, and cathartics are generally rendered useless by the irritability of the stomach. Calomel, in conjunction with opium, and sometimes one or the other separately, have been known to check the vomiting, and then cathartics have proved effectual. Beyond this, the case must be left to nature or the physician.

*Painter's Colic.* This form of colic is distinguished from every other, partly by its cause, which is the absorption of lead into the system, and partly by certain peculiarities in its progress, which we shall proceed to notice. The pain is usually seated, from the beginning to the end of the attack, in the pit of the stomach: from this point, it passes upwards into the arms, and downward to the navel, back, loins, and lower portion of the abdomen; sometimes extending to the thighs and legs. Along with this pain there is great external soreness, so that the patient is scarcely able to bear the slightest pressure. The bowels are firmly bound from the commencement of the disease. Nausea and retching begin on the second or third day, and are followed by vomiting of slimy and bilious matter. As the pain increases, these attacks of retching and vomiting become more frequent and severe, and continue till a favourable change occurs. Toward the close of the disease, the feet sometimes assume a red and swollen appearance. The first symptom of a favourable change is often profuse sweats, accompanied by a rash. The pain now becomes more tolerable; the patient feels an earnest desire to evacuate the bowels, and, on making the attempt, succeeds in

passing away some masses of hardened matter, of a rounded form and perfectly dry. When the disease has recurred several times, which it will continue to do from the same cause, the upper limbs are at length attacked with palsy; the fingers become contracted from a loss of power in the extensor muscles, so that when the arm is extended, the hand hangs down; and the limb thus affected, gradually shrinks. The fit itself is not often fatal. Its duration, under the most favourable circumstances, and the most judicious treatment, is seldom less than five or six days.

The disease was at one time termed the Devonshire colic, or colic of Poitou, from being most common in those parts of England and France. The reason of its prevalence in these places, was discovered by Sir George Baker, who ascertained, that the cider of the former country, and the light wine of the latter, contained, in solution, a certain amount of lead. The announcement of this occasioned great alarm to those accustomed to drink water from leaden pipes; but it is found that water, when pure, does not possess the power of dissolving metallic lead, and may, therefore, be kept in it, for any period, with entire impunity.

The laws of the action of this poison are involved in much obscurity. The most deleterious mode of exposure to its effects, is the inhaling, in large quantities, the fumes which arise from fresh paint, which is prepared by grinding white lead in oil. Lying for a few hours in a close room freshly painted, has proved sufficient to produce colic, palsy, and even sudden death. The following case, known to the author, illustrates the rapidity with which a fatal result may take place. A painter of irregular habits, returning to his lodgings at a late hour, and being unable to obtain entrance, went into the shop where were some window-blinds just painted, shut himself in and went to sleep. The next morning he was found, suffering great agony, but already paralytic. About noon, he expired.

All persons habitually exposed to the contact or inhalation of the oxydes of lead, are liable to attacks of colic. The manufacturers of white and red lead are the greatest sufferers; then come painters, miners, plumbers, type founders, glaziers, potters, and printers. In all these, the liability to the action of the poison, is very greatly increased by want of cleanliness in the poison and clothing, and by intemperance. The abundant use of animal fat as an article of diet, is said to be a preventive.

The attacks, when they occur, seldom yield to any other treatment than the persevering use of purgative medicine; and no advantage appears to be gained by resorting to the more

violent remedies of this class. In many instances, the disease will yield to the continued use of castor oil, in small doses, repeated every two or three hours. This may be aided, in obstinate cases, by injections of the same article, or of oil of turpentine. Where these remedies have failed, tobacco has been resorted to, and in some instances, the external application of cold water has produced a salutary shock; but these are dangerous and uncertain remedies, and only justified by unusual emergencies. The fact we have mentioned already, that the disease will, to a certain extent, have its course, must be kept in mind; or the strength of the patient may be exhausted, and unnecessary danger incurred by attempting to effect, prematurely and violently, what nature, if left to herself, would perhaps be able to accomplish.

*Liver Complaint.* The presence of inflammation of the liver, is recognised by the following symptoms. Together with chill and fever, there occurs pain on the right side, under the arches of the false ribs. The pain is accompanied with some degree of soreness, and tenderness on pressure. The skin is usually yellow, and the stools clay-coloured. Thirst, a furred tongue, and nausea, are also symptoms; and there is short dry cough, dependent, as is generally thought, on irritation of the diaphragm, with which the liver lies in close contact. Some variety is produced in the signs of the disease, by the particular seat of the inflammation. If it be on the surface of the organ, the suffering is greater than when it is more deeply seated. On the other hand, jaundice is a more prominent symptom, when the disease affects the substance of the organ, than when it is limited to the surface. In the latter case, the duration of the disease is often short, and resolution takes place on the third, fourth, or fifth day. This result is often marked by critical hemorrhage from the nose, by copious bilious discharge from the bowels, profuse sweat, or turbid urine. Inflammation of the substance of the liver, when not checked, occasionally forms abscess; an occurrence recognised by severe chills, and external swelling over the part, sometimes accompanied by distinct but deep-seated fluctuation.

The course taken by the matter, under these circumstances, is various. Sometimes it approaches the surface, and the surgeon is enabled to give it vent; sometimes it discharges itself into the neighbouring portion of intestine; in which case the pus is discharged by vomiting or purging, often producing a fatal termination within a few hours; and sometimes it passes through the diaphragm into the chest, opening either into the pleural cavity, where it forms an empyema, or into the lungs, from which it is rejected in large amount by the mouth. In a few instances the abscess has been known to open into the cavity

of the abdomen, where it produces extensive inflammation and death. Abscess, however, from acute hepatic inflammation, is rather uncommon in temperate climates. The substance of the organ is more likely to take on other changes, to become indurated and altered in structure, with increased liability to irritation from the action of remote causes; and thus the inflammation is rendered chronic. In this form, the pain is less acute, and there is less sympathetic disturbance and general fever. Both acute and chronic inflammation of the liver, are frequently accompanied with pain in the right shoulder, a symptom too vague to be much depended on, and one to which undue importance has been attached.

Inflammation of the liver is seldom a subject for the domestic practitioner, and it is then generally the acute form, induced by excess or atmospheric vicissitude, which demands his assistance.

The abuse of drastic cathartics, especially such as are commonly sold as specifics, will sometimes bring on an attack of this kind. In these cases the presence of nausea and jaundice will render proper the administration of an emetic; and if chill and general fever be manifested, a gentle perspiration must be excited and encouraged, the bone-set tea, and sweet spirits of nitre being among the best means of effecting this purpose. If the emetic fail to move the bowels, a gentle dose of salts or oil may be employed for this purpose.

General bleeding is not found to exert the same beneficial influence in this disease, which it exhibits in pleurisy or lung fever. It is useful at the outset, in severe cases; but it must be vigorously followed up by cupping or leeches, to the affected side. These may be advantageously succeeded by fomentations, or, when the force of the pulse has been diminished, by a blister; the latter being best suited to the superficial form of inflammation, the former to that which is deeper seated. The farther treatment will naturally come under the cognizance of the regular practitioner. The occurrence of severe and repeated chill, after the second or third day, will inspire a suspicion that suppuration is taking place, and suggest the necessity of employing those means which are found to accelerate this process; of which, heat and moisture externally applied are the most important. The care and management of hepatic abscess, however, demands all the resources of practised surgical skill.

Chronic inflammation of the liver, though, as above stated, frequently a sequel of the acute affection, is often developed insidiously, and, under this form the disease deserves a separate consideration. As seen in temperate regions, it is often induced by long continued habits of excess, or supervenes in



obstinate intermittents. It is indeed generally accompanied with fever of remittent character, having a daily evening exacerbation. The pain is often obtuse or even absent; but the organ, on examination, will generally be found harder and larger than natural, while the digestion is imperfect, the bowels costive, and the stools usually clay-coloured. This form of the disease is too often the index of a decayed and broken constitution, and, as such, yields with great reluctance to the most judicious treatment.

*Inflammation of the Kidney.* The symptoms of inflammation of the kidney are, in general, pain in one of the loins, shooting toward the bladder; numbness of the affected side; continual desire to pass urine; vomiting; and retraction of the testicle. The disease is most frequently dependent on obstruction of the ureter by some mechanical obstacle, especially calculus: it sometimes also results from mechanical violence, or from poisoning by Spanish flies. In these instances the symptoms are strongly marked, and the history of the case points out its character: but sometimes the only assignable cause is cold; and in these cases it is not always easy to distinguish the affection from rheumatism. In the latter, however, the pain is usually felt in both loins; there is no desire to urinate, no pain in the course of the ureter, and no retraction. That the symptoms indicate actual inflammation, and not mere neuralgic affection of the kidney, must be inferred from their constancy and from the state of the pulse. It often happens, for example, that the presence of a foreign substance or other cause may give rise to nervous irritation, accompanied by many of the signs of inflammation; but in these cases the pulse is comparatively but slightly affected, and the pains generally exhibit decided remission. In this disease, the fever generally runs high; and is singularly marked by frequent momentary chills. Acute inflammation of the kidney, not dependent on mechanical injury, is usually relieved, under active treatment, in from twenty-four to thirty-six hours; this relief being often accompanied with a copious flow of urine. Sometimes, however, suppuration of the organ follows: in this case, the pain is succeeded, on the third or fourth day, by torpor, heaviness of the part, and soon after a decided chill supervenes. The matter is sometimes discharged by the bladder, sometimes by an external opening, and sometimes it is effused into the abdomen. The first, as might be supposed, is the most favourable termination; the last is almost certainly fatal.

The remedies for this form of inflammation, are vigorous general, and local bleeding, the hot bath, fomentations to the loins, and large injections of as elevated a temperature as can be borne. Saline purgatives, and the sweet spirits of nitre, a

tea-spoonful every half hour, until relief is obtained, may be administered with great advantage; and narcotics are occasionally, but seldom, demanded by the violence of the pain. When suppuration occurs, the exit of pus must be promoted by the measures alluded to in treating of inflammation of the liver.

*Jaundice* is recognised by the yellow hue of the skin, which is most marked on the chest, and which extends itself to the membrane covering the eye-ball, and to the nails. Along with these appearances, the stools will be found more or less clay-coloured; while the urine, on the contrary, is of much deeper tint than ordinary, and communicates a decided yellow tinge to paper and to linen. These changes are commonly explained by supposing that the bile secreted by the liver is prevented from getting into the intestines, and that, entering the blood as bile, it is thus carried into the cutaneous vessels, and imparts to the skin its peculiar colour, while the office of conveying it out of the system is transferred for the time to the kidney. It is probable that, in some cases, the phenomena of the disease depend upon this circumstance. Yet some distinguished chemists have been unable to detect any bile in the blood of jaundiced patients, and, on the other hand, there are many instances of decided jaundice, in which the discharges from the bowels have been found of their usual colour. Those who maintain that the ducts are obstructed in jaundice, ascribe this obstruction mainly to two causes: first, spasm of these ducts, themselves; and secondly, the presence of gall-stones filling their cavity. But the occurrence of the former is at variance with the structure of these canals, and the passage of a gall-stone is a rare occurrence, and when it takes place does not always produce the symptoms of jaundice. But whatever be the difficulty of determining the immediate cause of jaundice, its remote or occasional causes are sufficiently obvious. It is generally brought on, either by imprudence in diet, such as eating fermentable, acrimonious, or otherwise indigestible food, by drinking cold water when heated, or by mental emotion. The latter may be either sudden, as a burst of anger or terror, or gradual, as depression and despondency. Long exposure to external heat produces jaundice, as is evident from the yellowness of skin exhibited by those who have long resided in very hot climates.

The attack commences with a sense of fulness at the stomach, attended with nausea and pain. To these succeed vomiting, and the rejection of all articles of food or medicine. The pain increases in severity, and shoots toward the left shoulder or spreads to the loins. The belly is usually distended; and the bowels costive. The deep yellow of the urine in the progress of the malady often changes to a dark red, like the

colour of venous blood. When the disease extends to the humours of the eyes, surrounding objects are seen tinged with yellow. The colour of the skin often continues after all the other symptoms have disappeared, and sometimes even the bones have become tinged with it. Long continued jaundice, however, generally depends on, or is connected with, chronic disease of the liver itself. In this case there is generally no pain, but the digestion becomes deranged, and the strength is gradually impaired. This is the form of the disease which is brought on by long continued residence in hot climates, especially in persons of luxurious habits, and also by frequent attacks of remittent and intermittent fever.

In the ordinary treatment of jaundice, the chief object is to stimulate the liver to a healthy secretion. For this purpose, an emetic is usually given at first, which at once excites an increased flow of bile, and causes it to be thrown into the stomach itself. This treatment often produces entire relief. If, however, the jaundiced hue of the skin continue unabated, the emetic must be followed by a cathartic, in which calomel should at least form a part. Five grains of this article, combined with two or three times the quantity of jalap, forms an excellent purge in cases of this description. With this, active treatment may be closed; but the different symptoms which remain, may still require attention. The soreness and tenderness on pressure, in the region of the stomach and the liver, may be relieved by some external irritation. A mode of applying this which has been considered as peculiarly appropriate, is the nitro-muriatic acid bath; prepared by uniting two parts of nitric, to three parts of muriatic acid, and diluting the mixture with from fifty to sixty pints of water. The mixture thus prepared is about as acid as common vinegar, and is sufficiently active to produce slight prickling when applied to the skin. This bath was applied in India, (where its use was first introduced,) to the whole surface by immersion; but it is sufficient to employ it as a foot bath, and at the same time to sponge with it the surface of the body. Employed locally to the region of the liver, it may be of double the strength above directed; the greatest inconvenience which can follow its use, being a sort of rash upon the skin, attended with some itching and a discoloration of the surface. We have introduced this mode of applying an external irritation as having been found especially useful in those countries where complaints of the liver are most abundant; but where the materials cannot be conveniently obtained, the more familiar modes of producing the same effect may be resorted to, with much advantage.

*Passage of Gall-stones.* Gall-stone bodies of irregularly rounded form and brown colour, usually occurring in the gall

bladder, though sometimes in the liver. They vary from the size of a mustard seed, to that of a pullet's egg. The texture is crystalline or lamellated. They are very light, and burn, when dry, with a bright flame, like wax. Their precise composition has not been determined, but they are evidently formed from the bile itself, and contain the same constituent principles varied somewhat in their proportion. They have been met with sufficiently large to fill and distend the gall bladder much beyond its natural size; but even one of these dimensions occasionally makes its way through the duct into the intestine, though this passage will not, in common, admit a crow quill.

Gall-stones are more frequently found in women than in men, and appear to be generally connected with a life of repose and indolence. Sometimes they occasion very little disturbance to the system, and are found in considerable numbers after death, without having been at all suspected during life. Dr. Heberden mentions an instance of one weighing a quarter of an ounce, which remained during life without causing any disturbance. Where irritation is produced, the means adopted by nature for the removal of the obstruction are sometimes not a little remarkable. An abscess may form and open externally; and, what is more singular, recovery may follow. By a process which we cannot here explain, the body has made its way into the intestine without having entered the duct. The latter, however, is the most frequent route, and it is its passage through this which constitutes the affection we now describe.

We may suspect that a gall-stone is engaged in the duct of the gall bladder when violent pain occurs at the pit of the stomach, accompanied with sickness and vomiting, the pulse, mean while, remaining perfectly unchanged in character. We say *suspect*, for none but the most experienced practitioners, or those who have already passed concretions of this character, can distinguish the attack decidedly from ordinary colic. There are two periods in the passage of a gall stone through the duct, at which the pain is supposed to be particularly severe. The first is, when the stone enters the canal, and the second when, quitting this, it passes into the cavity of the intestine. Between these, there is an interval of comparative ease.

The alleged objects of treatment in these cases are to diminish pain and to relax spasm. Perhaps we might with more propriety omit the last, for the nature of the peculiar action which urges forward the stone, is unknown to us; and could we succeed in relaxing the parts concerned in it, we might possibly prolong the suffering. Fortunately, nature seems to provide for the ultimate success of the process, when it has once commenced, and leaves us charged with little else than the re-



lief of the immediate suffering. For this purpose, we employ bleeding, general and local, which may be carried to the same extent as in other cases where the object is to afford immediate remission of pain. After this it is usually recommended to use purgatives, which, if they produce a beneficial effect, must do so by favouring the efforts of nature to rid herself of the obstruction. When the bowels are freely evacuated, opium may be tried, and probably, in the severer cases, the latter will be found necessary immediately after bleeding. Warm fomentations to the skin, and a warm bath, are also recommended, and, on the whole, it will be seen that the treatment best adapted to this purpose does not differ materially from that of common colic, except in the absence of all necessity for emetics and purgative injections; so that an error in the distinction between the two might be practically less important than would be at first supposed. The best means of preventing the return of the attacks is to use free exercise, and obviate the ordinary causes of dyspepsia.

*Worms.* The mode in which worms come to be generated in the human body is a subject of acknowledged obscurity and difficulty. Whether the embryo be produced in, or introduced into the canal, and, if the latter, whether by the food, the water or the air, are questions to exercise the ingenuity of the physiologist, but their consideration does not enter within the limits of our plan. It is sufficient to observe, that the worms which are found in the intestinal canal of the human subject have, in this, their appropriate abode. They are not found existing out of the body, and, when expelled spontaneously or by art, they instantly perish. Whether any animal, introduced into the stomach from without, except certain larvæ resembling the botts of horses and the worm of sheep, can withstand the action of the gastric juice, and remain a tenant of its dark prison, may well be doubted;—for the accounts of adders, toads, frogs, and other animals which have been discharged alive from the rectum, are to be regarded as mere fables, having their origin in gross self-delusion on the part of the patient, aided by pious fraud on that of his friends. Dr. Elliotson once saw two centipedes, said to have been vomited by a girl twelve years of age: they had then been living three days. Such cases, if they can be held as well established, are extremely rare.

The principal varieties of worms peculiar to the human subject are the long round worm resembling the earth worm, the ascarides or thread worms, and the several kinds of tape worm. The first and last are formed in the small intestines, sometimes in the stomach; the ascarides in the rectum, near its lower extremity. The large round worm is too well known to need

any description. The tapeworm is so called from its flattened form; it consists of long narrow joints; the head of some species terminates in a mouth, surrounded by two rows of hooks; the tail, in a semicircular joint, without any aperture. It reaches the length of thirty, forty, and even sixty feet! It is generally solitary, but sometimes collects in great numbers. The thread worm is about half an inch in length, and when thrown off, as it usually is, in considerable quantity, resembles the cut ends of thread. A longer thread worm is found in the larger intestines of sickly children, but is much less common than the preceding; it is about two inches in length, and differs in several particulars from the last named animal.

Worms are of such frequent occurrence in children, that either the round worm or the thread worm is supposed to exist in fully one half their number, but it is probable that this calculation is greatly exaggerated. It is extremely difficult, without seeing the animals themselves, to decide on their presence; as most of the symptoms which are supposed to be caused by them are common to other internal irritations. Among adults, one of the most certain causes of worms is the privation of salt as an article of food. The long round worms are much more frequently met with than any other variety, but it is by no means uncommon to see the thread worms associated with them in great numbers; and instances have occurred, in which all the varieties existed in the body at the same moment. Generally, the smaller the worms, the greater is their number.

We are justified in suspecting the presence of stomach-worms, when a child of from two to ten years of age presents the following symptoms:—wasting of the body; swelled and hard belly; gnawing or pricking pain in the stomach; pale countenance; dirty hue of the skin; irritation of the nostrils, manifested by a constant desire to pick the nose; fetid breath; and sleep with eyelids half closed, disturbed by frequent startings. With the ascarides there is less evidence of general, and more of local irritation: there is usually troublesome itching about the arms, evinced by a disposition to rub the part; and sometimes, on examination, a swelling may be detected. Worms have been known to produce obstinate cough, and children have even been supposed to be consumptive, and treated accordingly, until accident has led to the discovery of the source of irritation. The indications to be fulfilled by the treatment are, first, to destroy the life of the animal; secondly, to expel it when dead; and, lastly, to correct those morbid states of the stomach and bowels, which render them a fit receptacle for these troublesome parasites.

Among the articles which have been relied on, for destroying worms, we may mention the spigelia or pink-root. This

article is an acrid narcotic, and when given in too large doses, will produce symptoms of poisoning, such as dimness of sight, dizziness, retching, and even convulsions; but the medicine is very popular, both in the hands of regular and irregular practitioners, in the cure of that description of worms, which especially infest the stomach. The mode of administering it is to prepare an infusion of from a quarter of an ounce to an ounce of the root, according to the age of the patient, to give this in divided doses during one day, and, on the next, to work it off by a cathartic of senna. This plan often succeeds in bringing away large quantities of lumbrici, which are much more easily acted upon than the tape worm; but we think that the remedy should not be lightly employed by the inexperienced.

The next remedy which we shall mention, is the down of the *dolichos pruriens*, or cowhage. The pods of this plant are covered with a hairy substance, which, applied to the skin, irritates and inflames it. We are told, that in Guiana, where the round worms are very abundant, it is the custom for the planters to administer this article to their negroes, and particularly to the children, at least once a year. The dose is a tea-spoonful to a child, and double this quantity for an adult, in syrup or molasses: this is given in the morning, for three days successively, and followed up by a dose of rhubarb. After the second dose, the patient passes an incredible quantity of worms, partly lumbrici, and in part the long thread worm.

Notwithstanding the irritating character of the medicine, its spiculæ are not found to affect the coats of the intestines, so as to occasion any inconvenience. The same article, involved carefully in thick mucilage, and introduced directly into the lower bowels, is found to dislodge the ascarides.

A dose of calomel, proportioned to the age of the child, two grains for the first year, five grains after the fifth, adding a grain for every succeeding year, until the twelfth, given at night, and followed by senna in the morning, will often succeed in dislodging worms, especially lumbrici, from the intestinal canal. But this remedy should never be our first choice, unless the presence of some other disease require it.

A remedy which probably possesses a more decided control over intestinal worms than any other article, is the oil, or spirit of turpentine. The good effects of this article appear not to be limited to any one form of the disease. Even the tape worm, which is insensible to the action of most other vermifuges, often yields to this. Turpentine is given in doses of from half a tea-spoonful to an ounce, according to the age of the patient. Though it would be madness in the unprofes-

sional adviser even to copy the example, it may be mentioned as a curious fact, that five or six ounces have been taken at once with decidedly good effects, by patients in despair with tape worm. When the object is to attack the small worms in the rectum, it may be thrown directly into this part in quantities not differing, materially, from those above recommended by the mouth. When turpentine, given in the latter mode, does not operate, it must be followed up by castor oil.

The last vermifuge we shall mention, is common salt. This substance appears to dislodge every variety of intestinal worms, but it is chiefly employed in the treatment of ascarides. A tolerably strong solution, thrown up as an injection, will speedily displace them. When, by any accident, this description of worms have travelled upwards toward the stomach, draughts of the same mixture are peculiarly efficacious.

In addition to the list above given, almost all the drastic cathartics have been pressed into the service, either as having power to dislodge the worms, or to remove the slime in which they burrow.

With the exception of tenia, intestinal worms are usually expelled without serious difficulty. A more important matter in the treatment of children, is so to regulate the state of the stomach, and improve its secretions, that these parasites shall no longer be able to find a resting-place. This may often be effected by a well regulated, nutritious, and simple diet, in which sweetmeats, cakes, and butter, are, in a great degree, prohibited.

If, by this means, the disorder can be kept within reasonable limits, time and the changes it usually effects, will generally complete the cure.

Worms have, sometimes, existed for a long time, without producing any inconvenience, and instances have happened, where persons have voided tape worms of considerable length, of whose presence, until the moment of expulsion, they had not the most remote idea.

## SECTION VI.

### *Diseases of Fibrous Tissue.*

*Rheumatism.* The signs by which an attack of acute rheumatism is commonly recognised, are pains in one or more of the larger joints, as the shoulder, hip, knee or loins, aggravated by motion, and by exposure to cold or dampness.



Along with inflammation in the joint, there is more or less pain in the course of the adjacent muscles, which is likewise increased, when these muscles are brought into action. The muscles are often swollen, and by compressing them with the hand, much uneasiness is caused. In the milder cases, it is remarked, that though motion of the parts affected causes pain, yet, if this motion be persevered in, the sensibility diminishes, and only returns after a period of repose; so that the attack may sometimes be wholly overcome by active exercise; a circumstance peculiar to this form of inflammation. Another peculiarity of rheumatism is its disposition to shift from one joint, or set of muscles, to another.

This transfer often takes place in consequence of the means adopted to relieve an affected part, as local warmth, for instance, in consequence of which, another is left comparatively defenceless. The surface of the affected parts is often unnaturally red, swollen, tense, and tender; the joints of the hands and feet, when affected, are always so; but the larger joints sometimes retain their natural colour. In those who have once been affected, there is always reason to fear its recurrence from slight causes, or without apparent cause. It rarely occurs in young children, and is most frequent from the twentieth to the thirty-fifth year.

When rheumatism attacks the muscles concerned in breathing, the pain is aggravated by full inspiration, and in this respect the disease makes an approach to pleurisy. The means of distinction have been pointed out in our remarks on the latter disease. Generally speaking, the co-existence of rheumatic inflammation, elsewhere, and the constitutional liability of the patient to this latter affection, will furnish a rude diagnosis. When the pericardium is affected, which, from its fibrous structure, it is liable to be, there is, of course, local pain and disordered action of the heart: this complication of rheumatism is very common, and not free from danger. Sometimes the dura mater is attacked, and we have delirium and other threatening symptoms. Much more frequently the disease seizes on the external muscles about the head, causing headach, attended with peculiar soreness. The eye is not unfrequently the seat of rheumatic affection.

As rheumatism differs in its general course from common inflammation, so, many of the remedies which are employed with benefit in the latter are useless in the former. General bleeding is seldom of permanent service, except in very severe acute cases. Local bleeding by leeches or cups often relieves the part primarily affected, but appears to promote its transfer to others; and blisters are liable to the same objection: still, they are both necessary adjuvants in the treatment. The best

remedies, unless there are circumstances which particularly direct attention to the stomach, are sudorifics. In fact, the tendency of the disease to relieve itself by sweat, is often manifested throughout its course, though the energy of the system may not be sufficient to procure complete relief in this way. The sudorifics employed may be partial or general, external or internal. Local fomentations, with flannels wrung out of hot water, or of some anodyne infusion, will often be found serviceable. General sweating may be induced in various ways; such as fomenting the abdomen; placing the patient in a warm bed, and having the feet, while thus covered, immersed in warm water; and the general warm bath. Among internal sudorifics, the most successful, perhaps, are the Dover's and James's powder, particularly the former, which may be taken in the dose of ten to fifteen grains at bed time. In the early stage of rheumatism, when unaccompanied with fever, powdered guaiacum in the dose of a tea-spoonful, or the tincture in double this amount, is worth a trial. The latter may be swallowed in water or milk, but the mixture must not be allowed to stand, as the guaiacum very quickly subsides. Sometimes this remedy acts like a charm, producing an agreeable sensation of general warmth, and relieving the disease in a few hours. Like the remedies above mentioned, it should be taken in bed.

Another remedy which has acquired a reputation in rheumatism, is the seed or the root of the meadow saffron. Its use requires caution. We shall again refer to it under the head of gout.

The duration of acute rheumatism, if not relieved within the first twenty-four hours, is very uncertain. It often wanders from joint to joint, for eight, ten, twelve, or more days. This migratory state, however, is favourable, as no part becomes seriously affected; but whenever it fixes itself somewhat pertinaciously in a single joint, there is reason to fear permanent lameness of that joint, constituting the chronic form of the disease. In this form it is of indefinite duration; remitting its severity from time to time, but never wholly quitting the unfortunate member. The chest is rarely affected with chronic rheumatism; its principal seats are the loins, hip, and knee. The joint, except during the occasional exacerbations, is not either swollen or red, but cold and stiff, and is always relieved by local warmth. In the remissions of pain, it often becomes greatly debilitated, and the limb is rendered useless.

If the hip is the seat of the disease, the joint, from disuse and inflammation, may become permanently stiffened, so that the motion of the thigh upon the leg is lost. If the loins are affected, a similar result may occur; the spine is then habitual-

ly bent, and, in this position, a thickening of the fibrous parts, or an actual union of the bones takes place.

In this form of the disease, besides the remedies already mentioned, as guaiacum, Dover's powder, colchicum, &c., various external applications, of comparatively little service in the acute disease, may be employed with advantage. Friction with the liniment of ammonia, a cataplasm of mustard, or a blister, will often afford relief; a current of steam may be directed upon the part, or electricity may be tried.

The most remarkable, however, of these local means is a practice which has been introduced into use within a few years, under the name of acupuncture. It originated in the east, where it has been practised from time immemorial, especially in the Celestial Empire. It consists in the very slow introduction, by a boring motion, of one or more needles to the depth of an inch or more into the inflamed part, and allowing them to remain from five to six minutes. Little pain is produced, and no bleeding follows. At the end of this time the pain will be found to have ceased in the part, and perhaps to be transferred to another; if the same operation be performed on the latter, it will often vanish entirely. This mode of treatment is best calculated for fleshy muscular parts, and cannot be expected to succeed when alteration of structure, or stiffness of a joint, has taken place.

*Gout* has its immediate seat in the small joints of the extremities, and especially in those of the feet. The cause of its occurrence, however, in a large proportion of cases, is known to be a certain morbid state of the stomach, and of the digestive system generally. The subjects in whom it most usually shows itself, are those of sanguine temperament, of full habit, florid complexion, and rather coarse skin; persons of rather sedentary, indolent mode of life, and who, perhaps, without being intemperate, indulge freely in the pleasures of the table. It is more common in cities than in the country, in men than in women, in those using principally animal food than in those restricted to vegetable diet. From hereditary predisposition, however, and other causes not well understood, persons of very different habits are included among its victims.

Gout commonly makes its attack with pain in the ball of the great toe, and with a feeling of general chill. As the pain increases, this chill gives place to heat, and the usual symptoms of fever. The joint soon becomes more swollen, red, and tense, the redness disappearing when the surface is touched, and returning when the pressure is removed. The paroxysm of pain and inflammation continues perhaps with little abatement for 24 hours. At length, probably on the night following that of the attack, it begins to subside, and terminating with

a gentle sweat, leaves the patient to the enjoyment of repose. For several days the symptoms recur in the evening, though perhaps in a more tolerable form; and then subside, leaving the foot apparently sound, and the system in a state of increased health and vigour.

After the first fit, especially if the alarm of the patient induce him to reform his mode of life, the disease often absents itself for three or four years; then, generally on the occasion of some excess or imprudence, such as exposure, cold, severe bodily labour, mental application, or, in a word, any disturbance of the system, the attack is renewed: at each return, the interval is usually shortened, while, on the contrary, the duration of the fit is augmented; and, instead of subsiding in three or four days, it will at length continue, with occasional remissions, for as many weeks. From the prolongation of the fits and the contraction of the intervals, the affection sometimes becomes almost constant, so that the patient scarcely ever enjoys good health.

As the disease advances the symptoms are modified. At first the paroxysm appears without warning; afterward, it is preceded by a sense of coldness of the lower limbs; occasional pricking, alternating with numbness; slight shiverings; disturbance of the stomach, &c. At first, only a single joint is affected. Then the two feet are attacked in succession, the pain commencing in one as it subsides in the other. Then, perhaps, both are affected at once or alternately. At last, the other joints become involved, and the disease becomes universal, or nearly so; but the intensity of the pain diminishes, so that although there be no freedom from it at any time, the patient is able to give some attention to his ordinary occupations, even during the paroxysms.

Some permanent traces of the attacks are soon visible in the principal joints, which become swollen, stiff, and weakened, so that walking is performed with more and more difficulty. Mean while, the small joints of the toes and fingers are embarrassed by a whitish deposit, once supposed to be actually chalky, and still so called in popular language; but, in fact, consisting of the acids of the urine in combination with soda. Such quantities of this deposit sometimes accumulate, that an individual is mentioned who used in playing cards to score the points of the game on the table with his knuckles.

It is a general impression that gout, when it becomes habitual, absorbs all the morbid tendencies of the system, and keeps all other diseases at a distance. However this may be, it is worthy of remark, that individuals severely affected with it continue to an advanced age, often transcending the ordinary bounds of human existence. When gout proves fatal, it is gene-



rally by receding, as it is termed; that is, by suddenly quitting the extremities, while the stomach, the brain, or some other important organ, becomes the seat of inflammation.

On the means of preventing the attacks of this disease little need be said, after the enumeration of its remote causes. "Live on sixpence a day, and earn it," was the brief answer given by the eccentric Abernethy, to one who questioned him how he should escape; and probably no advice could have been more judicious. It has often been remarked, that persons who, after being in comfortable circumstances, were compelled by a change of times to labour for their sustenance, have been entirely cured by this reverse. Active exercise, combined with temperance, will sometimes check even the hereditary tendency to gout.

It would be wrong to conclude that an attack of gout is always a certificate of luxury, wealth, or indulgence. We have repeatedly met with it among the poor, and in the abstemious, both by choice and necessity; in old soldiers, washerwomen, shoe-blacks, sailors, seamstresses, and temperate farmers.

An empirical medicine, regarded as specific in this disease, has long been in use under the title of Husson's eau medicinal. Its immediate effect is to produce abundant evacuation from the bowels, of course increasing greatly the secretions from the whole surface of the intestinal canal. Whether this be or be not the true explanation, certain it is that the article alluded to has the power to shorten the paroxysm of gout. A similar power is possessed by the meadow saffron; which is generally thought to be the active article in the nostrum just mentioned.

It is now hardly to be doubted that these remedies act by producing counter-irritation on the bowels, and diminishing the inflammation by profuse discharges. They are very severe, drastic purgatives, and their action must be carefully watched. Their hyper-action brings on cramps in the bowels, and artificial cholera; which, if they occur, must be treated on principles already laid down. Their virtues are supposed to reside solely in the veratrine which they contain; but as this vegetable principle, when pure, is exceedingly dangerous in other than experienced hands, the vinous tinctures of the leaves, and root of the colchicum, though variable in power and soon injured by light and time, are considered the safest articles of the class. Of the former, the full dose is thirty, and of the latter, ten drops, three times a day; increasing the former by ten, and the latter by four drops per diem, until some pain in the bowels is produced, or until the doses have reached sixty and twenty drops respectively; but omitting the article instantly on the occurrence of any unpleasant symptom. Whenever

the medicine is supplied from a new parcel, we should re-commence with the first doses; for the strength of the preparation is always uncertain: and it is only in the absence of medical advice, that such articles should be exhibited by the inexperienced.

When gout strikes in upon the stomach, head, or heart, every external means should be employed, to provoke its return by stimulation. While the former organ is attacked, the patient for a few minutes is often apparently dying. In this case, a little wine or brandy should be given internally, and it is well to follow it, when the paroxysm is over, by half an ounce of the compound tincture of aloes.

That class of patients who are doomed to expiate the vices, or suffer the reflection of the misfortunes of their progenitors, often discard all violent remedies, provide themselves with patience, carbonate of soda, and flannel; and endure their appointed purgatory with a calmness and patience, which it is not easy, without some actual experience of the suffering, duly to appreciate.

#### SECTION VII.

#### *Nervous Diseases.*

*Chorea, or St. Vitus's Dance*, is more common in females than in males, and usually occurs in children from eight to fourteen years of age. The precursive symptoms are variable appetite, sometimes ravenous and sometimes wanting, a degree of listlessness and inactivity, a swelling and hardness of the belly, usually accompanied with constipation, and slight, irregular convulsive motions of the muscles of the face. As the disease advances, the muscles of the extremities, of the lower jaw, the head, and the trunk, are in various degrees affected. In this state the patient is unable to walk steadily, his only movement being a kind of jumping or springing; or, perhaps, he is compelled to run in order to make any progress. To whatever set of muscles it is attempted to communicate motion, these immediately become affected with the diseased action, and either refuse to obey the will, or obey it imperfectly, and by jerks in uncertain directions. Even if speech be attempted, articulation is found impossible, or the words are uttered with embarrassment and difficulty. In the progress of the disease, the eye loses its brightness and intelligence, and the countenance becomes pale and vacant. In some cases actual loss of mental power seems to follow.

The whole muscular system is never simultaneously affected:

and, in some instances, the perfect control which is retained over a part, compared with the mutinous state of the remainder, is very remarkable: sometimes, though the gesticulations are most absurd, the speech is easy and fluent; and sometimes, when unable to walk with any approach to regularity, the patient can sing and play with the most perfect correctness.

The predisposing cause of this disease is undoubtedly debility, generally dependent upon too rapid growth. The approach of puberty has been considered a predisposing cause of chorea; and so far as the changes then effected are causes of general weakness, the idea may be correct; but their farther influence may well be doubted. In boys, however, sexual excitement, and particularly certain criminal indulgences, not uncommon at this age, should be suspected, when symptoms of chorea begin to manifest themselves. The too frequent use of vegetables, and the presence of worms, are also regarded as common causes.

The treatment of chorea, in its advanced stages, is entirely beyond the reach of the domestic practitioner; and all that he can properly attempt, even at the onset, is to remove all the remote causes of the disease above enumerated, to establish a regular system of light, but nutritious diet, to administer some of the milder vegetable tonic teas, and leave the rest to nature and fresh air.

*Shaking palsy* is distinguished from chorea by appearing principally in persons advanced in life; and by the tremulous action being nearly constant, and not called forth or augmented by attempt at voluntary motion. Shaking palsy is also marked by a tremulous motion of the whole head which is not characteristic of chorea. To palsy, properly so called, the malady in question has but a remote resemblance; the sensibility remains unimpaired, and the control over the muscles, though diminished, is scarcely ever wholly lost.

The approach of the disease is so gradual, that six, eight, or ten months elapse before any material inconvenience occurs, except a disposition to bend the body forward in walking. At length, the legs begin to be affected, and locomotion is accomplished with more difficulty. When the patient attempts to advance, he finds himself thrown upon his toes, and is compelled to adopt a running gait, in order to prevent himself from falling forward. In a still later stage, the tremulous motions take place during sleep, and awaken him suddenly in great agitation. The power of conveying the food to the mouth, and of swallowing it when taken, are as much impaired as in St. Vitus's dance. As a fatal termination approaches, the disease assumes more of the character of real palsy. The extensor muscles of the neck gradually lose their power, so that the

chin rests on the chest; the power of articulation is lost; and at length the control ceases even over the natural evacuations. In this form the disease is peculiar to old age, and to the intemperate. It seems to be beyond the reach of medicine.

A peculiar affection, called *the gilder's tremor*, occurs in those who have been exposed to the fumes of quicksilver. The first symptom is unsteadiness of the arms, which, gradually increasing, extends itself to other parts of the body, and renders it impossible for the patient to walk, to speak, or even to chew. If the employment be persevered in, loss of memory, sleeplessness and delirium ensue. But if the occupation be abandoned, the disease generally proves curable.

*Convulsions* are marked by such a variety of symptoms as to make it difficult to embrace them in any general description. What may be considered common to all, however, is an irregular spasmodic action of some of the muscles, while others are forcibly contracted. The sensibility is impaired or lost, and the power of utterance suspended. It is said that in the convulsion fit the two kinds of spasm, the rigid and agitative, are about in equal proportion, while in epilepsy the latter, and in hysterics the former predominate. As epilepsy and hysteria constitute the most severe forms in which convulsion shows itself, we shall offer a brief description of each; while our curative remarks will be principally directed to the milder and more manageable forms, which depend rather on accidental causes than on peculiarity of constitution.

In *Epilepsy*, the person attacked loses suddenly all sense and power of motion; so that, if standing, he falls immediately, or is thrown by convulsion, to the ground. In that situation he is attacked with violent spasms, variously moving his limbs and the trunk of the body. Commonly the limbs on one side are much more violently affected than those on the other. In all cases the muscles of the eyes are especially agitated, so that the lids open and shut in perpetual motion, or are stretched in a full stare, while the eyeballs are rolled rapidly in every direction. The muscles are alternately rigid and relaxed, the mouth foams, the tongue is forcibly protruded, and often bitten by the spasms which affect the under jaw; the whole face is hideously distorted, and frequently of a deep purple. The muscular power developed during the paroxysm is enormous, so that the strength of five or six persons is required to restrain the struggles. These fits frequently commence with a violent scream: their ordinary termination is in sleep. They recur upon almost any occasion of bodily or mental excitement, and often without any assignable cause. The disease is frequently hereditary. The paroxysms generally commence from the age



of fifteen to twenty-five years, and when the habit is once formed, it is fortunate for the patient if they do not continue through life. If incurable, they terminate sooner or later in madness or idiocy.

*Hysteria* most generally occurs in females, between fifteen and thirty years of age. The fit commences with a coldness and shivering over the whole body, a quick but fluttering pulse, and an acute pain in the head. Some pain is also felt in the belly, generally on the left side; from this a ball seems to move with a grumbling noise through the abdomen; thence, after various evolutions, it rises into the stomach and then into the throat, where it seems to remain for some time, and, by its pressure on the larynx, to cause a feeling of suffocation. This sensation is peculiarly characteristic of this affection. To this succeed stupor, insensibility, and convulsions. The trunk of the body tosses to and fro, the limbs are variously agitated, the hands are firmly clenched, and the breast is often violently beaten. Sometimes there is a singular combination of sobbing, crying, laughing, and shrieking, in the midst of the fit, and sometimes obstinate hiccough. The insensibility in hysteria is usually incomplete, the patient having some consciousness of what is going on around her. After alternate remissions and exacerbations, the convulsions cease entirely, and are succeeded by a state of lethargic sleep. More or less suddenly, and frequently after repeated sighing and sobbing, the patient returns to consciousness, with no other feeling of inconvenience than perhaps a slight pain and a general sensation of soreness. Hysteria is not usually hereditary, and is far less likely to be followed by serious consequences than epilepsy.

*Convulsions from accidental and transient causes*, present for the most part those symptoms which are common to the above described diseases: they exhibit, however, a greater resemblance to epilepsy, from which they differ principally in being less violent, and in the absence of the creeping sensation, that precedes the attack of the latter. Among these accidental varieties, however, some deserve particular mention: as the infantile convulsion, usually induced by surfeit or by the irritation of teething; those of children, produced by similar causes, or appearing as precursors or consequences of eruptive fevers; those manifested during child-birth; and, lastly, those arising from loss of blood. Convulsions also appear as symptoms or concomitants of other diseases, as of worms, hydrocephalus, and gastric or intestinal inflammation; are sometimes induced by constipation, and sometimes by affections of the mind.

The first object in the treatment of these accidental convulsions is, to attack the remote cause; this indication, however, can seldom be answered, except in the infantile convulsion, and in

that of labour. In these, the necessity for this kind of relief is often imperious; for, though the immediate fit may terminate spontaneously, it will continue to recur as long as the cause of offence continues. In the case of fits from surfeit in children, the cause must be removed by an emetic. In that from teething, the gum which causes the irritation must be lanced; and in the puerperal variety, under certain conditions, delivery must be effected. But we also possess direct means for lessening the violence of the spasmodic action and abridging its duration; and these may be employed where no reference can be had to the remote cause. Of this class is bleeding, which is peculiarly necessary in the puerperal form, and may with safety be resorted to in adults, whenever there is evidence of plethora or vascular fulness. In children, bleeding is seldom needed; a warm bath, with friction to the extremities, will generally subdue the spasm. At all ages, what are called the anti-spasmodics deserve a trial, since, if they do no good, there is little danger of injury from their use. Such are ammonia, camphor, and valerian, the advantage of which can be combined by adding to the ammoniated tincture of valerian an equal quantity of a saturated solution of camphor in alcohol; and administering the compound in doses of twenty to fifty drops. In cases where the cause seems to be merely nervous irritability, and it is an object to prevent the formation of an injurious habit, the sudden application of cold, by dashing cold water over the head, will sometimes not only terminate the fit, but prevent its recurrence. It is, however, a harsh remedy, and if it fail at one trial, it will be a useless cruelty to repeat it.

We have said nothing of the special treatment of epilepsy and hysteria, because there is always time and opportunity enough for medical consultation in these diseases. On emergencies, the practice recommended above may be safely instituted.

*Catalepsy or Trance* is characterized by the abolition of sense and voluntary motion, the breathing and pulse continuing, and the body, trunk, and limbs receiving and retaining any position which may be communicated to them. It most usually occurs in females of nervous temperament, but from what exciting causes is not known. The disease is, without question, often feigned, but it also occurs under circumstances which wholly forbid the idea of deception. The state of trance commences without previous warning, and generally terminates with sighing. The duration is very various, the fit, in some instances, continuing only a few hours, or even minutes, and in others, lasting whole days. The breathing is extremely feeble, and sometimes the pulse wholly impercep-

tible, so that persons in this state have been supposed to be actually dead.

Attacks somewhat similar to trance, have been known to occur to persons while walking, and in these instances, though consciousness was lost, the motion was continued, so that the state approached very closely to that of somnambulism. The disease is rare, and is not amenable to medical treatment, except of a general character. There are some instances on record, in which accidental bleeding has proved critical. One is that of a young girl, who became cataleptic at ten years of age, the paroxysms recurring at shorter and shorter intervals, and resisting all medicines. In one of these attacks the girl dashed her head against a sharp stone, and a profuse hemorrhage ensued. The bleeding not only put an end to the fit, but prevented its return.

*Apoplexy.* A sudden and general loss of sense and motion, with slow breathing and pulse, the inspiration often attended with a snoring sound, constitute apoplexy. It is to be distinguished from palsy, because, in this last, the loss of motion is partial only, and the functions of the senses, with the exception of the general feeling of the part attacked, though impaired, are not suspended.

Apoplexy generally occurs in persons with short necks, and large heads, who have passed sixty years of age, who are more or less inclined to corpulence, and who unite great mental application with bodily inactivity and a liberal indulgence of the appetite. Intemperance in drinking is generally regarded as a cause; and, no doubt, confirmed sots often die of apoplexy: but it is equally proved by experience, as remarked by Dr. Cheyne, that the daily use of wine or spirits will lead a man of a certain age and constitution, to apoplexy, as certainly as habitual intoxication. Cases also frequently occur in spare old men, of great bodily activity and temperate habits; so that no kind of constitution can be regarded as exempt.

Among the occasional causes, may be mentioned violent exercise, especially when combined with exposure to the sun; exposure to a warm and impure atmosphere, such as is produced by the collection of large numbers of persons in a confined space; excess in drinking: the presence of undigested food; long stooping or hanging of the head; a ligature or tight cravat about the neck; and violent mental emotion.

The proximate cause of apoplexy, or the state of system which produces it, is probably pressure upon the brain, at the origin of the nerves, which proceed from it. This pressure may be the effect of a tumour within the cavity of the skull; of effusion of blood, or serum; or simply of unusual fulness

of the cerebral veins. That the first and second are causes of apoplexy, has been shown by the examination of those who have died of this disease, and the last appears highly probable from the nature of the remote causes, and the mode of the attack.

In the paroxysm of apoplexy, the patient should, if possible, be carried into a cool apartment, of large size and well ventilated. He should be placed in bed or on a sofa, but with the head considerably raised.

All unnecessary company should be excluded, and all unnecessary conversation prevented.

It is probable, indeed, that in genuine apoplexy, all consciousness of what is passing around is suspended; but the nature of the case may not be such as suspected, and the patient, though unable to express himself, may be fully aware of the import of the expressions used by others. All portions of dress, which encumber or bind the person, especially ligatures about the neck, should be removed; the feet should be immersed in warm water, and the legs rubbed with stimulant applications.

When the movements show that nausea is present, when the attack follows immediately on a meal, or when there is any strong reason to suspect the presence of indigestible food in the stomach, an emetic should be immediately given, without regard to the increased pressure on the brain, produced, for the moment, by the action of the remedy, which pressure is less likely to occur in apoplexy, than in most other diseases, because the abdominal and thoracic muscles are prevented by their torpidity, from taking their usual very active part in the process of vomiting. They leave the effort mainly to the stomach itself, and hence, the blood in the thoracic and portal vessels is not forced out mechanically, which is the mode by which all the other blood vessels, and those of the head among the number, are distended in ordinary vomiting. Unfortunately, it is often extremely difficult to rouse the stomach to action in apoplexy; and although medical men possess many very powerful and prompt emetics, the only one which we can conscientiously recommend, on emergency, to the domestic practitioner, in the cases under notice, is thirty grains of ipecacuanha, with two grains of tartar emetic, given in a little sirup or molasses.

If an emetic operation be obtained, it should be followed by the administration of a powerful cathartic, which may be aided in its operation by a stimulant enema. As the object is to produce a prompt effect, the cathartic should be chosen with reference to this property. Perhaps the most convenient and effective article, for this purpose, is the croton oil,



in doses of one drop diffused in water or milk. This may be repeated every two hours, until an effect is obtained. Meanwhile, active friction, with Cayenne pepper, or other stimulating substances, mustard cataplasms to the feet and legs, and external warmth, wherever the temperature is reduced below its natural standard, will be useful auxiliaries.

There is a popular, but ill-founded notion, that bleeding is a specific in the treatment of apoplexy. That it is generally advisable is certain; but it is equally certain that there are many cases of exception. The populace, and, with them, the unreasoning and less informed of the profession, have run wild in favour of a favourite remedy; and, as usual, partisans of an opposite extreme in opinion have recently arisen. Some modern physiologists, remembering but a few of the predicates of the problem, have concluded that the quantity of blood in the head cannot be either increased or diminished by any circumstances whatever. Hence, say they, bleeding can have no effect in lessening the pressure of blood upon the brain! Not one of the postulates upon which this doctrine is founded is physically true; and the lemma engrafted upon it is an *exquisite non sequitur*!

As these opinions have received the sanction of men of high note in the profession, who have unfortunately disregarded the first principles of hydrostatics in their physiological reasoning, we think it right to enter our protest against the hypothetical objections to the use of the lancet in the treatment of apoplexy. But let it be distinctly understood, that the remedy must be used with all the precautions observed in its employment in other diseases.

When there is no strong reason to suspect that distention or irritation of the stomach has caused or exacerbated the attack, there is no temptation to employ an emetic; but whether this remedy be prescribed or not, if the patient be not an habitual toper, if he have no previous disease of great debility, if the face be flushed or purple, and the pulse slow and extremely feeble or irregular, a vein in the arm should be opened with a large orifice, and the patient bled freely, and as rapidly as possible, until the pulse is decidedly diminished in force, or increased in frequency: but where the face is pale, marking a violent revulsion from the surface, or when the constitution has been previously broken down by disease, or when the pulse is feeble and fluttering, and death impending, we must depend exclusively upon the counter-irritants and other adjuvant remedies already prescribed. If a pulse, at first weak, should, as it sometimes will, acquire additional force during the progress of bleeding, the flow must not be checked until the force of the circulation again declines.

*Palsy.* Apoplexy, when not immediately fatal, is apt to terminate in a state in which the power of motion, and usually, the sensibility of one side of the body is lost, and the powers of the mind, especially the memory, impaired. This state constitutes one form of palsy, and is termed *hemiplegia*. In these cases there is every reason to believe that the affection or accident in the brain, on which the apoplexy depended, is of a nature to remain permanently, or for a considerable time. It is worthy of observation, that, when palsy proves fatal, it does so by again passing into the state of apoplexy. In a few cases, hemiplegia occurs without any preceding apoplexy. These cases sometimes originate from exposure to the sun, drinking cold water when heated, repelled eruptions, &c. Sometimes an intimation is given of the approach of the attack by pain in the head, a difficulty of moving the tongue, and the loss of perception and of memory. But the attack itself is sudden; so that the patient, if standing upright, drops down upon the affected side.

In *paraplegia*, which is another variety of palsy, the loss of power and sensibility is confined to the lower part of the body. This disease is often dependent on injury of the spine or the nerves of organic life; but often comes on without any known cause. At first there is a slight numbness in the lower limbs, with a stiffness or awkwardness in moving the muscles. By degrees these symptoms increase; there is great difficulty in walking, and inability to preserve the balance, so that the aid of a staff or the arm of an assistant is needed. At first the bowels are costive, but at length the discharges are made involuntarily. The disease may continue for years, but the patient sinks at last from general exhaustion. Recovery is rare.

*Local palsy* occurs most frequently in the muscles, about the angle of the mouth, but may also affect the eye, the cheeks, a hand, an arm, &c. It may originate from disease of the brain, the spine, the bowels, or even from the wound of a nervous fibre. We have known it to occur severely in the face, from the irritation of small fragments of the sockets of extracted teeth. It is sometimes the precursor of a more serious attack, either apoplectic or paralytic, and, therefore, a most dangerous symptom; at others it marks important disorders in the nerves of the abdomen, as when seen in painter's colic: and sometimes it is transient and free from danger, as when it follows the extraction of a tooth.

In the onset of hemiplegic affection, we may pursue the treatment fitted for apoplexy, except that it would be madness to exhibit emetics here, unless in cases of poisoning, which occasionally produces this form of paralysis, though very rarely.

In paraplegia the spinal marrow is generally the seat of the principal mischief; and this form is often occasioned by poisons. Emetics are then our main dependence in the commencement.

The seat of partial palsy is so difficult to determine in most cases, that unless symptomatic of some of the diseases already described, we would seriously advise the intelligent domestic observer, to regulate the diet and habit of the patient on correct hygienic principles, and then to leave the case entirely to nature.

There appears no sufficient apology for touching upon the after treatment of palsy in the present work. It is a difficult business, requires no particular promptitude, and professional advice on the subject may always be obtained in time for all useful purposes.

#### SECTION VIII.

##### *Prominent Symptoms, and Accidents.*

*Dropsy.*—The immediate cause of dropsy is an undue accumulation of fluid, either in the cellular substance which intervenes between the skin and the muscular tissue, or in the serous cavities.

The quantity of effused fluid, in either of the situations just referred to, is dependent upon two opposite processes,—*deposition* and *absorption*. It is evident that either an augmentation of the former, or a diminution of the latter, would be adequate to the production of the disease. Accordingly, it has always been a subject of discussion, whether dropsy should be considered an active or a passive affection; whether the capillaries should be considered in fault for separating too much, or the absorbents for taking up too little. The dispute is much like that regarding the colour of the camelion, *and we leave the intelligent reader to decide it.*

*Cellular Dropsy* generally shows itself in the lower limbs, where it is marked by a cold diffused swelling, which, when pressed, leaves a pit or impression of the fingers for some time. It may be either a symptom of some internal effusion, or a distinct affection. In either event, however, the progress is slow. The swelling appears first about the feet and ankles, and is more or less observable through the day, disappearing or being much diminished during the night by the recumbent

posture. By degrees it becomes more permanent, ascends higher, affects the legs and thighs, and finally, may even reach the trunk and face, which last becomes pale and bloated. If the disease advance, the skin of the legs gives way, and the accumulated fluid either collects in sacs under the cuticle, or oozes out in drops.

Other symptoms, common to this and other forms of dropsy, when not the result of simple debility, are general inactivity, costive bowels, constant thirst, urine deficient in quantity and of deep colour, a failure of the appetite, and emaciation.

In *hydrothorax*, or dropsy of the chest, the fluid is accumulated in the cavity of the pleura. The peculiar symptoms are a sense of oppression in the chest; difficulty of breathing on exercise or on lying down; livid countenance, irregular pulse, and palpitation.

These appearances, however, are deceptive, and unless fluctuation, of which we shall speak presently, can be perceived, the existence of water in the chest is scarcely to be distinguished with certainty from other affections.

When the disease takes the form of *ascites*, or dropsy of the abdomen, the water is usually contained in the peritoneal cavity; and its presence is readily recognised by the sense of fluctuation which is produced when one hand is placed on one side of the belly, and the opposite side is gently struck or tapped with the other. This form of dropsy is often complicated with more or less disease of the liver. The quantity of fluid collected has been, in many instances, surprisingly great. Twelve gallons and a half have been discharged through an artificial opening at one time. The symptoms, with the exception of the gradual swelling of the belly, which cannot fail to be remarked, resemble very closely those of hydrothorax; but there is less embarrassment of breathing.

The three forms of dropsy which have been mentioned, especially the first and last, are very frequently united, and arise from causes in many respects similar. They form the sequel to fevers and inflammatory affections, especially of the pleura and the peritoneum, and are often among the signs of the decay of constitutions impaired by early excesses, by exposure to varying influences of climate, and by hard labour.

The treatment is chiefly directed to two objects, the evacuation of the effused fluid, and the prevention of its return. In cases of anasarca and ascites, direct means of evacuation are afforded by surgery. In the former case, scarifications made with a lancet through the tumid integuments will permit the effused fluid to escape; and in the latter a more complete evacuation may be effected by tapping. But as these means are palliative merely, they are now never employed, except under



urgent necessity. To cause the evacuation of the superfluous fluid through the natural channels, emetics, sudorifics and blisters, have been often resorted to; but the principal remedies employed have been, first, the drastic cathartics, which, from their peculiar operation, have been termed hydragogues, and which produce abundant liquid evacuations from the alimentary canal; and secondly, the diuretic class, which cause a like tendency of the fluid to the urinary passages. The particular remedies of both classes are numerous; but we must be content with adverting to the principle on which they act. It is no part of our purpose to encourage the domestic practitioner in their employment. The re-accumulation is prevented by whatever has a tendency to strengthen the constitution and increase the vigour of the absorbent system; and hence tonics, especially the vegetable bitters and the preparations of iron, have always been considered as among the best. Dropsy, and especially that of the feet, when the result of simple debility, as is often the case after rapid growth in children, long continued convalescence, &c., will often recover gradually without aid. The tonics are properly administered in protracted cases of this character.

We have reserved for a separate consideration three forms of dropsy, in many respects differing from the foregoing, both in their causes and their course; two of which have this circumstance in common, that they are often congenital, and even exist previously to birth; and, the third, as coming within the domain of surgery, will require only a passing notice.

*Water in the Brain* forms a frequent termination of that peculiar disease in children, to which the name of hydrocephalus is applied, but in which, frequently, neither the symptoms during life, nor dissection after death, countenance the idea of any effusion whatever. As, however, the name must be retained, and as the true dropsy of the brain is for the most part an infantile affection, it will be most convenient to treat of both forms of affection under a single head, distinguishing as far as possible the symptoms peculiar to each.

Inflammatory hydrocephalus, though sometimes found in adults, is mostly limited to the first seven years of life. The commencing symptoms are those of irritation generally, and very similar to those produced by worms. Such are irregularity of bowels, and especially costiveness, listlessness, impatience, knitting the brows into a frown, a sense of weight in the head, which the patient is constantly desirous of resting upon a chair; irregular fever, and sometimes pain shooting through the head from temple to temple; accompanied, perhaps, with sickness at stomach. The vivacity and good-humour proper to childhood are lost; the eye becomes dull, and

the cheek pale, with occasional irregular flushes. The child walks infirmly, and even staggers. The pulse is quick, but irregular, the sleep interrupted and uneasy, and the eye assumes an oblique or squinting appearance. The pupil, which is at first contracted, at length dilates, and is no longer affected by light. There are paroxysms of fever, generally coming on towards evening, but sometimes irregular in their appearance. The head is felt to be hot, and severe pains are complained of in the forehead. The approach of the fatal termination, is marked by wild and sudden screams; irregular contraction and dilatation of the pupils; throwing back of the head, delirium, vomiting and convulsions.

In many instances, on examination, a certain amount of fluid, varying from a few tea-spoonsful to eight or ten ounces, has been found in the brain. This effusion, however, is not to be considered so much the cause of death as an evidence of the extent to which the inflammatory action has proceeded, and which would be sufficient to destroy life whether effusion took place or not.

The duration of the disease varies: commonly it runs on from three to six weeks; but it may prove fatal in a fortnight, or even in two or three days. When it extends beyond six weeks, it is to be regarded as chronic; and, in this form, may go on even for years.

From the difficulty of distinguishing this disease, with certainty, in its earlier stage, it has been made a question whether a genuine case has ever recovered. This view is, perhaps, too discouraging; but it seems to be admitted on all hands, that the time for action is at the outset, and that if the disease be neglected or misunderstood in its earlier stages, the chance of recovery is exceedingly small.

The remedies employed in this disease are mostly those adapted to active inflammation generally, and consist of local bleeding, the application of cold to the head, and mercurial purgatives. The two former should be used freely and fearlessly, and the calomel has been urged to the extent of producing salivation with the most happy results. Of course, nothing but dire necessity would induce a domestic practitioner to charge himself with the treatment of this affection.

In the true dropsy of the head the whole course of symptoms is of a milder and less violent character. It not unfrequently commences antecedently to birth, and the head of the infant is then found already enlarged. The accumulation has been known to amount to five pounds of fluid. This disease often shows itself some months, or even two or three years, after birth. As it proceeds the head very gradually enlarges,

\* For farther details, see Diseases of Children, (Chap. iv.)

and the bones are separated from each other. Sometimes a small, distinct tumour appears at the top of the head, which increases for a time, and then declines, being finally merged in the general swelling.

Cases occasionally happen in which the disease, after reaching this stage, passes into a chronic form, and the subject lives to manhood with no other inconvenience but that arising from the deformity and weight of the head itself. In other cases, this protracted form is accompanied with occasional attacks of convulsions, under which the patient at last sinks, after having reached the age of twenty or even thirty years. In others, again, the fluid is apparently absorbed, and the constitution finally triumphs. We are told of one instance in which this favourable change took place under the influence of mercurial medicine. Here the disease commenced at the age of four years, and increased for six months, at the end of which time the head was as large as that of an adult. After the treatment was instituted, the skull ceased to augment, and the intellect gradually brightened. At twenty, the individual was in full possession of his health and faculties, with a head scarcely larger than it had been fourteen years previous.

In this form of dropsy the head has frequently been punctured, and the effused fluid allowed to escape. This operation has generally been attended with relief; and, in some instances, has effected a cure of the disease. The most satisfactory account of the result of this operation, is one published by Dr. Conquest, of London. Dr. C. operated on nine cases, in four of which he was entirely successful.

*Heart-burn.* This affection is characterized by a peculiar burning sensation at the pit of the stomach, accompanied usually with eructation of an acid liquid. It comes on from one to two hours after taking food, and the acid, which is identical with vinegar, is evidently generated during the process of digestion. The immediate cause of heart-burn, therefore, is derangement or imperfection of the digestive process; and this again arises partly from the debility of the stomach itself, and partly from the introduction of crude and unyielding articles of diet. It occurs particularly in those who have impaired the tone of the stomach by the alternate use of very cold and very hot beverages; who have indulged freely in spirituous or fermented liquors; who have long been subjected to the influence of tropical climates, or who have accustomed themselves to powerful cathartics. The article of food which, as a general rule, is most likely to produce it, is animal oil or fat, in the form of rich meats, gravies, drawn butter, toasted cheese, &c. Pastry, in all its forms, is one of the most efficient means of inducing heart-burn. Next to these are to be ranked those

culinary compounds which are composed of flour, eggs, sugar, and various other ingredients combined; and which are farther prepared for the process of *digestion* by the addition of hot sauces. Next come cakes of various kinds, and most of the results of the confectionary art; and fully equal to these in their power to generate acid, are all rich and oily nuts. In enfeebled stomachs, however, and those peculiarly prone to the complaint, nine-tenths of the ordinary articles of food become exciting causes. Butter, sugar, fruit, vegetables of all kinds, (excepting, perhaps, a potato,) and even bread itself, are viewed with distrust! till a morsel of dried meat, a soda biscuit, and a little brandy and water, constitute the sum total of the luxuries of the table.

*Water-brash*, so called, differs from heart-burn in this, that the eructation is generally in greater quantity, and is wholly destitute of taste. It is most apt to occur early in the morning, and at other times when the stomach is empty. It seems to be connected, more peculiarly than the other, with a relaxed state of the fibres of the stomach, brought on by indulgence in spirituous potations, and more particularly perhaps in malt liquors; but it sometimes affects temperate persons from causes similar to those of common heart-burn. It is often accompanied with a sensation of faintness.

Relief is afforded, during the paroxysms of heart-burn, by the use of alkaline substances, such as magnesia, chalk, and ammonia, which neutralize the acid. The compound formed by the magnesia is cathartic, and that by the chalk, astringent; so that the choice between them is determined by the costive or lax condition of the bowels. Other articles proposed appear to have a direct effect in sheathing the gastric membrane from acrimony. Such is the case with oil, and especially with soap, which is probably decomposed, its alkali being seized upon by the acid, while its oil serves the purpose above mentioned. These remedies are merely palliative and temporary; and oil is objectionable as being one of the very articles which produce the affection. A far better plan consists in avoiding those articles which are found to disagree with the patient; but were this plan rigidly pursued, and every such article positively discarded when found to produce acidity, the stomach would soon be found in some cases irritable from exhaustion, and the patient in danger from mere inanition! It is highly necessary, therefore, in both the affections we have been considering, to impart vigour to the organ by tonics, &c. The remedies and regimen adapted to this end will be considered under the head of dyspepsia.

*Flatulence* is another of the annoyances to which feeble stomachs are subject. It consists in the extrication from the



food of large quantities of gas, principally the carbonic acid, which is sometimes eructed, sometimes passes downwards, or may remain pent up in the cavity, producing a rumbling noise and more or less uneasy sensation, though seldom actual pain. This gas is the product of fermentation; and this process, which is prevented when digestion takes place in a healthy manner, here goes on under the combined operation of heat and moisture, as if the vital influence were checked or withdrawn. When the quantity of gas thus separated is large, and finds no natural outlet, the abdomen becomes sometimes greatly swelled, and tense like a drum.

There is a class of remedies called carminatives, supposed to act primarily on the mucous membrane, and, by sympathy, on the muscular fibre of the stomach, so as to enable it to expel its contents, and in a degree to resist distention, when a new supply of gas comes to be produced. Familiar examples are seen in the seeds of the caraway and cardamom, the aniseed and coriander, the leaves or calyxes of the spear-mint, peppermint, thyme, &c., also in ginger, and the aromatic spices. But it is still to be remembered that these are palliatives only, and that their repetition, instead of increasing, serves only to impair the tone of the stomach. It might be supposed that some antiseptic taken with, or immediately after the food, would prevent this affection; and the correctness of this principle, to a certain extent, is proved by the beneficial effects of charcoal. The means of effecting the principal object, the restoration of energy to the stomach, by which it may secrete its proper juices, remains yet to be considered under the head of dyspepsia; but we cannot resist the temptation to mention the fact that several of the most obstinate cases which ever came under our notice, recovered speedily and perfectly under the use of the common table salt, given dry, in doses of a tea-spoonful three or four times a day.

*Costiveness.* As a general rule it is essential to the maintenance of perfect health, that the bowels should be moved once in twenty-four hours. Every deviation, therefore, from this condition, though not a ground for alarm, should be at least regarded with distrust. Among the causes which are likely to produce this deviation are sudden changes of diet, such as a change from one consisting principally of vegetables, to one in which animal food has the largest share; a change of water from a less pure to a purer article, especially from one impregnated with saline ingredients, to one destitute of them; change of air, as that of the plain for the mountain,—the land for the sea; (but in this last case other circumstances usually co-operate to produce the effect;) also change of habits, as from a less, to a more sedentary occupation. Accidents which, with-

out impairing the general health or appetite, compel the individual to almost absolute repose, nearly always produce constipation. Any circumstance which induces inattention to the regular evacuation, or which makes constant attention inconvenient, will have the same effect. The immediate, proximate cause of the change in these cases is not easily discovered, but in a few particular cases may readily be conjectured. Thus, the costiveness which belongs to convalescence from long continued disease, is the natural result of the activity with which absorption is carried on for the supply of the system, and which leaves the residuum wholly deprived of its fluid portions, and in a state which renders its expulsion difficult. The costiveness of jaundice is also easy to be explained; for here no bile finds its way into the canal, and its fibres are not moved to their natural and healthy action.

Some of the means, by which the bowels may be relieved from a state of costiveness, have been anticipated in speaking of the causes by which the state in question is induced. The articles of food which have obviously had an influence in causing the complaint must be omitted; and a diet principally vegetable, with a moderate use of fresh fruit when in season, may be substituted therefor. Of the materials commonly employed in making bread, the flour of India or rye meal is more opening than that of wheat, and the latter is rendered more so by being combined with the husk or bran, which is usually separated from it by the process of bolting. Together with an appropriate selection of articles of diet, a due share of bodily activity is highly important; and of all kinds of exercise, probably the best adapted to promote the evacuations, is walking. The effect of exercise on horseback, and in carriages, is, in many persons, entirely opposite,—for reasons of which, we freely confess our total ignorance.

Among the mechanical aids for promoting regular evacuations, there is one which has attracted much notice within a few years, though by no means of modern suggestion;—that of kneading or shampooing the belly. This may be easily practised by the patient upon himself, and thus the double purpose, of exercise and of mechanical pressure, is answered.

Of the medicinal articles, commonly employed to relieve constipation, the list is sufficiently long; and the very variety and number of those in common use, serve to show how very unsatisfactory are the results derived from them all, when their use is depended on as a substitute for the natural and spontaneous actions of the system.

In choosing medicines for habitual constipation, regard seems to have been had principally to the convenience of the form, and the smallness of the bulk, in which they could be

administered. Hence the preference for the drastic purges, so called; such as aloes, jalap, scammony, gamboge, &c. These, with calomel and rhubarb, form the materials of nearly all the popular cathartic pills, whose composition has become known. These nostrums are not ordinarily open to the objection that they purge violently or produce pain: the general difficulty in their use is, that they create more trouble than they relieve. Their operation is followed by increased torpor, for which an augmented dose is needed: from one or two pills, the patient proceeds to ten or twelve, to fifteen or twenty; till finally, the amount necessary to produce the effect desired becomes absolutely enormous. With all this, no immediate or violent effects are manifested; but the digestion, instead of improving, becomes more and more deranged, the appetite is lost, and the stomach becomes the seat of sub-acute inflammation, which sooner or later, if the treatment is persisted in, closes in death. Such is not an uncommon termination of the habitual and excessive use of cathartics. Such a habit should never be formed, if it be possible to avoid it. If there be any mode in which articles of this description can be persevered in without injury to the system, it is by combining them with the food itself, in such a manner as to supply, in some measure, its defective stimulating power. A small piece of the root of rhubarb, after a meal, chewed and mingled with the saliva, will often answer this purpose in a very effectual manner.

In most persons, calomel, instead of losing its effect by use, actually acquires force by habitual employment, and is, therefore, exceedingly well fitted for some forms of costiveness. To be useful in this way, it must be given alone; for in all its combinations with other purgatives, it loses the property above mentioned; *a result which also follows, if it be given in doses unnecessarily large; and this fact we would strongly impress upon our western readers, among whom the abuse of calomel is carried to a most shocking extent, even by some professional men.* The plea that decidedly larger doses are required, in consequence of the peculiarities of the climate, is absurd, when reference is made to countries within the temperate zone. We have practised in tropical countries, where large doses are really required; but even there, they bore no proportion to the enormous quantities usually given in the West. We have practised in the West, and our chief occupation was the removal of the bad consequences of large doses of calomel, by the proper employment of smaller ones!

In the habitual costiveness of middle-aged and elderly females, marked by too light a colour of the stools, we have never failed in breaking the habit by the following means,

though we have attacked cases of thirty years' standing, in persons aged from sixty to seventy-five years.

Let the patient take five grains of calomel at bed-time. If it do not produce a free stool by ten o'clock next morning, increase the dose to eight grains, and if it produce more than two stools, diminish the quantity to three grains. Let the medicine be given every other night, until it begins to produce more than two stools. Then omit it until costiveness returns. On this return, commence with the last dose, and continue till more than two stools are again produced. Then omit, and proceed as before. After a time, if the habit prove obstinate, the calomel will frequently produce four or five stools when given in doses of a single grain! but usually the habit is broken before the quantity requires to be diminished below three grains—which is the quantity commonly required from the first. Always diminish the dose whenever the first exhibition brings on three or more evacuations, and increase it if no discharge follow; but when the increased quantity also fails, it is safest to administer some stronger purgative, such as senna, or rhubarb, and jalap, omitting the mercury for three or four days, when the larger quantity may be tried again.

Under this course of treatment, if advantageous, the intervals between the returns of costiveness, though, at first, enduring but two or three days, are soon elongated to a week; a month, and many months. We thus treated an old lady of seventy-five, and childish, who for more than forty years, had but one stool per week. The remedy was administered at seven intervals. She has been perfectly regular for several years.

*Indigestion or Dyspepsia.* That state of the stomach, in which it is incapable of performing its appropriate function, of changing the received food into chyme, is termed dyspepsia. Some of the effects and concomitants of this state, and the means of relieving them, have been already touched upon, under other heads; but the more general consideration of the affection has been reserved for this. Whether the immediate cause of dyspepsia is to be sought in the debility of the muscular fibre of the organ, or, in the defect or bad character of its secretions, is a question not easily determined in all cases. There is little doubt, however, that both causes usually coexist; the tendency of the food to the acetous fermentation seems to be the effect of the latter; while the tendency to distention, and the difficulty with which the aliment is urged forward into the intestines, is a proof of the former. Other symptoms of dyspepsia, besides those already alluded to, are oppression at the stomach after food is taken; a sense of weight and drag-



ging about the limbs, while the digestive process is going on; a sensation of gnawing rather than hunger felt whenever the stomach is empty; a disposition to sleep after meals, which, when a full repast has been taken, is almost irresistible; and frequently a heavy dull pain about the head. The modes in which indigestion is induced, are nearly innumerable; and as almost all of them may be inferred by the intelligent, from the principles and facts contained in the chapter on Hygiene, we shall not dwell upon them at present; but one very universal cause demands the especial attention of Americans; namely; the habit of too rapidly swallowing food, by which sufficient time is not allowed for the process of mastication, and for the secretion of the fluids which aid digestion.

The general means by which dyspepsia may be avoided, are to be inferred from the nature of the causes by which it is induced. But its cure requires other considerations, for it is not always that even a bad habit can be wholly omitted with impunity, nor will its discontinuance always repair the mischief which its indulgence has occasioned. As respects intemperance in the quantity, and variety in the kind of food, the principle of sudden reformation may safely be practised; and those accustomed to bolt their aliment without taking time for mastication, will find no inconvenience in adopting more civilized customs. The regulation of the mind and the due control of the passions also require no caution.

But the change from sedentary to active habits is one of more difficulty. The sedentary student may be fully persuaded of the advantages of exercise, and may, with all earnestness, attempt a reform; but if the exercise be tedious or distasteful; if he walk without an object or interest, merely to accomplish a task, and with his mind still occupied by his previous studies, he will gain little benefit. Exercise must be an actual relaxation and amusement, or it will fail in producing its effect. It is on this ground that travelling, which combines bodily motion with a change of scene and pursuit, is so often recommended. Exercise should produce fatigue, but not exhaustion. The indigestion arising from ardent spirits can be cured only by abandoning their use, and substituting therefor some of the bitter tonics, to which allusion will presently be made. That from coffee can generally be obviated by the substitution of tea; and that from the use of green tea by the use of black; which produces, usually, little disturbance, either of the stomach or the nervous system. Opium, in every form, must be totally abstained from. To obviate the cravings occasioned by its disuse, the bitter tinctures which contain a narcotic principle, such as those of valerian, hops, &c., may be employed.

The remedial measures for giving tone to the stomach, and for improving the character of the secretions, are, in general, those, which are termed tonics. They are supposed to exert their action on the muscular fibre. They are generally bitter substances, and are employed either in their simple state, or in the form of tincture. Of the propriety of employing these spirituous preparations, there has been no little question among the advocates for total abstinence from all distilled liquor. But it is at least certain, that the injurious effect of the spirit is very considerably modified by the addition of the bitter principle, and that this is generally borne better by the stomach, when first submitted to the action of its appropriate solvents. Among the most popular of these preparations may be mentioned Huxham's, or the compound tincture of bark, which, in addition to its principal ingredient, contains snake-root, saffron, orange peel, &c.

Whatever virtue the above articles may possess in their character of tonics, they are still to be regarded as subordinate to those more general means which communicate vigour to the stomach by strengthening the whole system. Such are the breathing of fresh, pure air; the due exercise of the muscular system; cold and warm bathing; and the maintainance of a well regulated mind and a cheerful temper.

In connexion with the subject of indigestion, it may not be useless to suggest some brief remarks in the choice of articles of diet, and the regulation of meals. In making these, we are not ignorant of the ridicule which attaches to such precepts delivered without regard to the constitution and circumstances of the individuals addressed. We are aware that it is impossible to frame rules of living which shall apply at once to the hardy and robust denizen of the country, labouring with his own hands, and eating his bread, literally in the sweat of his brow, and to the pampered and indolent son of fortune surrounded by luxuries which he has lost the power to enjoy. Still there is a large class to whom sound maxims of dietetics will apply, and for whom they will possess interest. We allude to that portion of the inhabitants of cities and towns, whose occupation is continued from necessity through eight, ten, twelve or more hours each day, and is not of a nature to bring into exercise the larger and more powerful muscles; in other words, persons of sedentary or stationary employments, fixed to one sphere and to one kind of labour, whether this consist in writing for the press, settling accounts, setting types, regulating watches, mending shoes, or attending to millinery or mantua making. Such persons constitute, perhaps, one-fourth of the adult population of towns. What proportion of them actually suffer from indigestion, we are unable to conjecture; but we

are well convinced that, in a very large number, the functions of the stomach are performed in a manner far from satisfactory. All these persons have an interest in the general principles of dietetics, and however diversified their condition and circumstances, these principles admit of a ready and simple application to all. We shall offer then, for the especial benefit of these persons, some few remarks on diet, the choice of food, and the regulation of meals.

One substantial meal of animal food is sufficient for the daily supply of a man in health, engaged in business involving ordinary labour. The custom, therefore, of taking meat for breakfast, and again at supper, is perfectly unnecessary and unquestionably pernicious. The principal meal should be taken about one or two o'clock, so as to occupy about the middle of the waking period. The animal food should consist of one dish only, and that, of easy digestion. Fish, and particularly shell-fish, disagree with some weak stomachs, and are apt to occasion an eruption upon the skin. Yet where they sit easily and are relished, several of them, particularly the crab and lobster, are found to neutralize acid in the stomach, better than any other description of animal food. The oyster also forms an exception to the general character of this class, being, when simply cooked, of extremely easy digestion. Of meats, the perfectly healthy kinds, among which the choice is nearly indifferent, or may be determined by individual experience, are beef, roasted or broiled, mutton, lamb, or venison. Of poultry, chickens, roasted or boiled, are among the least objectionable: of fresh fish, most descriptions, boiled or broiled, with the exception of salmon, which is too rich. Of vegetables, rice and potatoes are the lightest and most nutritious. Peas, beans, and squashes can be indulged in by most with impunity; and the tomato possesses properties which render it, for a relish, as salutary as it is grateful. Among those viands usually introduced, which are to be received with distrust, are the salted meats, generally; as ham, salted beef, pork, &c. These are objectionable on account of the fat they contain and the form in which it is presented; but, in small quantities, and particularly with the aid of some condiment, such as mustard, or horse-radish, they are borne well. Fresh pork, whether young or old, is unwholesome to all but hard-working men. The flesh of goose is oily, and its nutritive qualities not easily extracted, except by a strong stomach. Many meats, however, which are too rich to be eaten alone, are improved by combination with the cruder vegetables, and by the addition of acids and other stimulants. Thus, salad, and even cucumbers, when dressed, assist the digestion of ham or pork; and, on the same principle, a goose may be disposed of with the aid of that well known sauce which is

obtained by boiling apples in cider. Of such combinations, however, the dyspeptic, unless experience has taught him their adaptation to his own particular system, will be wary; and will rather depend on what he knows to be wholesome, than hazard his comfort by any rash exposure.

Among culinary vegetables, the turnip disposes to flatulence; a fact equally true of the onion, but this vegetable possesses valuable properties which establish its claims to extensive use. The beet, the carrot, and the ruta бага, have the same fault as the turnip, besides possessing a saccharine principle which is apt to be converted into acid. The class of preparations termed puddings, have not found much favour in the eyes of the learned; and probably, no one of the tribe has been more generally denounced than the dumpling; yet the experiments of Dr. Beaumont go to show, that neither beef nor mutton is so soon disposed of by the human stomach as this same dumpling. We mention this, not to encourage the imprudence of eating them, but to show that the rapidity with which an article is digested in a strong stomach is no proof whatever of its fitness for a weak one. According to Beaumont's experiments, a dish of tripe, some boiled salt codfish, with raw cabbage and vinegar, should form the favourite repast of the philosophic. Experience, however, does not justify these conclusions, true as respects a single individual, but not capable of universal application. It is due to the learning and good sense of Dr. B. to acquit him of intending to found general rules on these particular results.

Articles, perfectly wholesome in themselves, may become objectionable from the form in which they are taken. This observation applies to minced dishes—no very tempting preparations—and to jellies, which are generally considered as peculiarly fitted for the invalid, from the facility with which they are swallowed. If taken without mastication, they make no impression on the salivary glands, and entering the stomach unmixed with the secretions of these organs, are digested with difficulty.

Water is of course the best of beverages. The best substitute, when water is found to encourage the formation of acidity in dyspeptics, is perhaps a little tea, of moderate strength, taken after, *not during* the meal.

For the morning and evening meals, custom has so fully established the use of coffee and of tea, that any attempt at interference would be hopeless. It may be useful, however, in order to determine a choice in doubtful cases, to allude to some of the circumstances by which their respective effects are found to differ from each other. As a general rule, coffee acts more especially on the digestive, and tea upon the ner-



vous system. Coffee, to most persons, is laxative; and it is this effect, the absence of which is missed when its use is first abandoned for that of tea or other liquids. Coffee, in any quantity, is apt to be followed, in persons of weak digestion, by a peculiar sensation of sinking and faintness at the pit of the stomach, occurring about two hours after the meal is taken, and lasting, perhaps, for the same period. It is usually most marked in warm weather, and is accompanied by a distressing sense of debility and relaxation. It somewhat resembles the sensation of hunger, and is sometimes relieved by swallowing some light farinaceous substance. Both coffee and tea produce wakefulness; but the latter is more certainly followed by this effect. In most persons, tea, especially when taken towards evening, produces a brightening of the intellect, and an agreeable sensation of gayety and cheerfulness, which do not belong, in the same degree, to the use of coffee. An occasional change from one to the other, is better than a long continued perseverance in either.

Among the usual substitutes for coffee, as a morning meal, may be mentioned milk and chocolate. A sudden change to either, will probably produce heaviness and headach, which are rather to be attributed to the absence of the usual stimulant, than to the presence of any principle in these articles themselves. If persevered in, either will at length be found nutritious and digestible. To this rule there are some exceptions in persons otherwise healthy, but in whom one or other of these articles is always followed by unpleasant effects. For weak stomachs, the shells of the cocoa may be advantageously substituted for chocolate.

Butter, as an addition to bread, is equally grateful and salutary; but the enormous quantities which are used by some persons, at each of the three meals, are decidedly injurious, often producing nausea, and sometimes serious disturbance.

*Vomiting.*—The act of vomiting, when spontaneous, is frequently a salutary effort, on the part of the stomach, to rid itself of an offending substance. It is often also artificially and intentionally excited. Under neither of these circumstances, can it be regarded as a disease, unless, in the one case, it continues after the cause is removed, or in the other, passes the bounds by which its beneficial operation is limited.

There are, however, some other varieties of morbid vomiting. Sea-sickness may be considered as one; for although the tendency of this may generally be to health, it often proceeds to an extent which makes remedial measures necessary. The vomiting from inflammation of the stomach, is another morbid variety; and there are many individuals in whom, from habit, or peculiarity of constitution, vomiting occurs

upon very slight occasions, or without apparent cause, and continues until active measures are adopted for its relief.

Excessive vomiting, after a surfeit, or entire evacuation of the organ, may often be relieved by the simple expedient of taking some light nutriment in a liquid form, rendered grateful by the addition of spicy, aromatic ingredients, such as arrow root, for example, with nutmeg and wine added. If this be rejected, a little green tea will perhaps be retained: if the vomiting continue obstinate, it may be necessary to administer a cathartic injection. These means seldom fail in accomplishing the end proposed.

When the vomiting from an emetic threatens to prove obstinate, it is usual to give a draught of the infusion of chamomile, or some aromatic herb, as balm, mint, sage, &c., which usually succeeds in arresting it. Should this not answer, a few drops of laudanum may be given, either alone or in combination with a carminative tincture. Sometimes the evolution of carbonic acid gas in the stomach, by a draught of soda water, is found effectual; and sometimes a few drops of a bitter tincture, particularly the Columbo root, has been successful. Vomiting from emetics, unless they have been given in excessive and unreasonable doses, very rarely escapes the control of these and similar remedies.

Sea-sickness is generally regarded as a self-limiting disease; and it is certainly true that it rarely proves fatal. But it is often exceedingly desirable to abridge the duration of this distressing affection, especially in feeble subjects, and those exhausted by previous disease. The healthy and vigorous, provided they can command resolution to resist its influence, and to exert their muscles in the open air, soon overcome it. Where this expedient cannot be resorted to, or fails, a little hot brandy, or Jamaica spirit and water, will sometimes serve to settle the stomach; and some nourishment, in a liquid form should be tried as early as possible. But a most powerful remedy for sea-sickness,—one that will often control it after several days have elapsed, and other means have failed,—is a strong tea of horsemint, (*monarda punctata*) given cold, in the dose of a wine-glassful, every hour.

Some of the most obstinate cases of vomiting occur in debilitated habits, and especially in those who have destroyed the tone of the stomach by the constant use of opium or alcohol. Such persons are in the habit of subduing slighter attacks of nausea by a resort to their favourite sedative; till, at length, the irritability of the digestive organs become so highly exalted, that these means prove wholly unavailing, and the stomach obstinately refuses to receive the slightest portion of food ci-

ther solid or fluid. These attacks are, in the habitual drunkard, sometimes of a salutary character; the liver assumes unwonted activity, the bile is secreted in great abundance, and the system undergoes a thorough renovation. Frequently, when the vomiting ceases, or is checked, in such cases, inflammatory disease or the delirium peculiar to drunkards at once succeeds, and we are justified in supposing that these affections are in many instances prevented, in others rendered milder, by the process in question. The propriety of arresting it, therefore, when occurring in such subjects, might be questioned; but decide as we may, its arrest is rarely within the ordinary resources of art. It will almost invariably run its course. These attacks may sometimes be checked without much hazard, by employing the vegetable bitters; the chamomile and worm-wood have been particularly recommended. A blister applied to the region of the stomach is another appropriate remedy.

Inflammation of the stomach may be suspected, when, to obstinate vomiting, continued for many days in succession and recurring after apparent relief, great tenderness at the pit of the stomach is added. In some of these cases, the patient, though tormented with intense thirst, dares not swallow the slightest portion of liquid; and yet total abstinence itself affords but a partial and imperfect relief; for an empty retching torments the sufferer, when nothing is introduced into the organ from without. These cases require, in some respects, the ordinary treatment of inflammation in general; but their management demands the highest order of medical skill, and cannot be discussed in a popular work.

*Hiccough.* Although hiccough has its immediate seat in the diaphragm or midriff, it is seldom or never dependent on disease of that organ, but almost always arises from irritation in some other part, and especially in the stomach. It may be induced by mere distention of this organ; as in infants, in whom the disorder is very common, from over-nursing. The presence of flatulence is a very frequent cause of hiccough; as is also the irritation produced by worms. Other causes, more distant or more general, will occasionally excite it, as disorder of the liver, and the irritation produced by strangulated hernia. Lastly, it is among the signs, and, in certain cases, the surest sign of approaching dissolution.

Although hiccough generally disappears with the cause which gave rise to it, it is, like other spasmodic affections, very dependent upon habit, and, hence, not only liable to recur upon slight occasions, but, when present, to go on obstinately at intervals of a few seconds, until it becomes a serious inconvenience.

Hiccough may usually be checked by forcibly holding the

breath: and it is also a familiar fact that any sudden emotion, especially of fear or surprise, which powerfully arrests the attention, will have the same effect. This principle is often rendered available, in a familiar way; but its operation was probably never more effectually displayed than in the case of a young girl in Paris, who had been tormented almost constantly for six months, and who was brought to the hospital under the charge of Dupuytren. After trying the warm bath, and some other remedies to no purpose, the Baron ordered a red hot iron to be applied to the pit of the stomach, on which the spasms immediately ceased.

When the complaint occurs in severe diseases, it sometimes requires vigorous treatment as a symptom, but the application of the necessary measures must be left exclusively to the profession.

*Cramp.* The precise nature of the influence which the brain ordinarily exercises over the voluntary muscles is not known; but the fact is obvious that by the mere exercise of volition we are able to contract these muscles, and by so doing to communicate motion to the parts to which they are attached. In a state of health these muscles, if not acted on by the will, remain quiescent; but in various morbid states of either of these organs, the nerves of organic life, the spine, or the brain itself, this exclusive control is lost; and the muscle may contract, not only without any exercise of volition, but in defiance of the will. These deviations from healthy action are, in general, termed spasms; and these may be either constrictive, when the affected muscle is fixed rigidly until a counteracting force or another spasm produces relaxation; or clonic, when the affected part is made to move in short irregular twitches. Under the head of constrictive spasm are included some of the severest diseases to which the human system is subjected; but the affection at present under notice, though often exquisitely painful, is seldom dangerous.

The most usual seats of cramp are the calves of the legs, the neck and the stomach. In regard to affections of the last organ, it cannot with propriety be said that the control of the will is withdrawn, since in fact the organ is not usually subject to this control; the disease here consists in the substitution, for the ordinary and healthy peristaltic actions of the fibres, others which are irregular and unhealthy. The cramp which attacks the legs usually occurs in the night, when the limbs by long rest have become stiffened. Cramp often occurs in swimming, and seems here to be owing partly to the impression of cold on the surface, and partly to the restraint imposed on the muscles by being employed in an unaccustomed series of movements;



for, the more familiar the exercise, the less likely is this effect to follow.

The relief of cramp, which is for the most part obtained without medical aid, consists in opposing the constrictive action of one set of muscles by a voluntary exertion of the opposite. If, for example, the legs be spasmodically contracted, the will must be exerted to extend them. Often, however, it is found necessary to bring some extraneous force to bear on the part for the same purpose; and hence we find persons affected with cramp of the leg drawing the limb with the hand in the opposite direction. This plan is often aided by friction.

Habitual cramp is generally a symptom of chronic irritation of the small intestines, resulting from some error of habit or diet, which being discovered and removed, the paroxysms of cramp disappear.

*Bleeding from the Nose* occurs spontaneously under a great variety of circumstances, in many of which it may be regarded as unquestionably a salutary evacuation. We have already noticed its occurrence in catarrh, in which disease it often affords immediate relief to the inflamed mucous membrane. In other cases, the inflammations relieved by hemorrhage from the nose are located in distant parts; as, for example in the throat, the lungs, or the membranes of the brain.

This discharge is often of advantage when it supervenes upon local plethora or congestion, such as is produced in the vessels of the brain by close mental application. It is a common occurrence, and often equally advantageous, in children who are undergoing the natural changes which take place as they approach the age of puberty. Where habitual excesses at the table, and inactive habits, bring on a confirmed and general plethora, requiring periodical evacuations, the nose often acts as the flood-gate of the system; and on the sudden suppression of established discharges or local irritations, which, though morbid in their nature, have become necessary to the health, by custom, the blood vessels of the nose occasionally open their sluices to the relief of the vital organs too frequently attacked in such cases. In violent paroxysms of passion or emotion, and in powerful muscular exertions, the rush of blood to the head would much more frequently occasion apoplexy, were it not that the sudden flow of blood from the nose often comes on and checks the attack.

In these cases, hemorrhage from the nose cannot be regarded in the light of a disease, but the amount lost in certain instances becomes in itself a source of immediate danger, and in others the vessels of the mucous membrane become debilitated by habit or disease, in such a manner as to lose in part

their power of retraction; and thus what are termed passive hemorrhages are produced, which are always more difficult of restraint either by natural or artificial means. In certain families, a tendency to this form of hemorrhage is hereditary, and frequently the same disposition is noticed in individuals as an idiosyncrasy. These last are by far the most troublesome forms of the complaint. It is certain, however, that when bleeding from the nose has become purely passive, it will proceed, if unchecked by art till it produces the most alarming symptoms. The quantity lost under these circumstances is sometimes enormous. Ten, twelve, and even twenty pounds, have been known to flow before the bleeding stopped. One case is recorded of forty-eight pounds; one of eighteen pounds, within twenty-four hours; and one of seventy-five pounds within ten days, being double the quantity generally supposed to be contained in the whole body. It is evident that in the last case immense supplies must have been furnished by absorption to compensate the drain thus made upon the system.

Independently, however, of those protracted hemorrhages which demand prompt and effective relief, there are considerations of convenience and comfort which make it desirable to check all bleedings, as soon as the relief demanded by the system is obtained. Nothing so readily becomes a habit, when indulged; and there is no habit with which, when confirmed, it is more dangerous to interfere. It must be checked, therefore, if at all, at the onset; and, except under very peculiar circumstances, such as the presence of inflammatory disease, apprehension of apoplexy, or the recent suppression of some very important discharge, the attempt may be made with safety, even from the commencement of the flow. When the evacuation is absolutely needed, mild measures will rarely prevent it from proceeding; while more severe remedies will, of course, be deferred, until the symptoms become alarming.

The complaint rarely comes on, absolutely, without provocation. The slightest local irritation will produce it; but some irritation is necessary. Sneezing, the act of picking the nose, friction of the face after washing, stooping, &c. will often be sufficient to induce it in those predisposed. The entire avoidance of all these causes is, of course, impossible; but if they have been observed to act only periodically, as at a certain hour of the day, &c., a little caution will often prevent the anticipated attack; and thus, at least, break in upon the habit.

The bleeding itself may frequently be arrested by the most simple means. The application of cold to almost any part of the surface will produce contraction of the extreme vessels generally, in which those of the mucous membrane affected

will participate. The simple expedient of placing a cold body, as a piece of iron in winter, or ice in summer, on the neck or back, will often be sufficient. A decided chill may be induced by the application of ice to the forehead and temples; and with more certainty, but less safety, by immersing the feet in extremely cold water. An agent of still more power, when it can be brought into action, is pressure upon the bleeding vessels by means of tents of sponge, lint, or muslin, which may be pushed into the nostrils from before,—or, if necessary, and surgical assistance be present,—from behind also.

Injections of astringent substances into the nostrils, have often arrested hemorrhage; and, of these, the best is the saturated solution of alum. When the plugs of lint, above mentioned, are steeped in this solution, their usefulness is generally increased. Creosote has been recommended for the same purpose; but our experience with this boasted remedy has not tended to raise our opinion of its powers in controlling hemorrhage. The dry powders of vegetable substances, have proved very efficacious, when taken in the form of snuff. They act by promoting coagulation; but the powdered leaves of the St. John's wort, (*hypericum perforatum*,) has succeeded so admirably, in three cases of obstinate passive bleeding from the nose, that we cannot but recommend it to farther notice, as probably possessing other more efficient virtues.

In some cases of obstinate and long continued bleeding from the nose, after every other remedy, internal and external, has been tried to no purpose, and great exhaustion has followed, it is found advantageous to resort to the use of direct stimulants. In a case of this kind, related by a distinguished medical author, the bleeding had continued for four days; during which time, the patient, a feeble woman, had been allowed no other nourishment than toast water. She was pale, sick, and without pulse. Port wine, with astringent injections into the nostrils, were prescribed, and, in a short time, the bleeding began to abate.

The change from a meager to a better diet has had a happy effect in somewhat similar hemorrhages, from other parts; and in the hereditary variety, opiates appear to have succeeded in one case.

*Strangury* consists in a painful emission of urine, which comes away only by drops, and generally with a sense of burning or scalding. The most common of its remote causes is the application of cantharides, in blisters, or internally administered. The immediate difficulty in this case, is probably an inflammation of the neck of the bladder from the absorption of the flies. Strangury is sometimes brought on by colds. The indications of treatment are, to diminish the local

irritation, and to dilute the urine. The first object may be attained by the warm bath, fomentations to the abdomen, and warm injections; the latter being, sometimes, rendered more effectual by the addition of laudanum. At the same time, the mucilage of flaxseed or gum Arabic should be taken internally, in unlimited amount.

A total stoppage of the urine may arise from the aggravation of those causes which produce strangury, and, in this case, is removable by like means. But there are other causes also peculiar to this affection. A spasm of the sphincter muscle of the bladder may ensue on long continued voluntary retention, as when the mind is ardently engaged, and the calls of nature are neglected. This stoppage is generally relieved by the warm bath. There are other causes of strangury or retention of urine, but they are surgical in character, and need not be mentioned here.

*Diabetes.*—The peculiar symptoms of *diabetes mellitus*, or *saccharine urine*, is a profuse discharge of the urinary secretion, of a peculiar odour, resembling that of violets, and a sweet taste. The latter has been distinctly traced to the presence of sugar, resembling in all important particulars that of the cane. The attendant symptoms are thirst and debility; the accompanying circumstances are a voracious appetite, a dry, harsh skin, a clammy tongue, and general emaciation.

It would be impossible, within our limits, to do justice to the description and treatment of this singular affection, which is too frequently fatal in spite of all the exertion of the practitioner; but the possibility of its occurrence, and the leading circumstances that characterize it, should be known to every one; since, if not checked at its outset, it is rarely controllable at a later stage. Whenever, therefore, the above combination of symptoms presents itself, it should attract immediate attention, and no time should be lost in seeking the best advice.

*Gravel.*—The urine in its healthy state always contains more or less alkaline matter, held in solution by its peculiar acid, the uric or lithic. This alkali, which is for the most part of a calcareous character, is immediately secreted by the kidney itself. If either of these principles be in excess in proportion to the other, a deposit will take place, either acid or alkaline. In the former case, it sometimes concretes in the kidney, where it forms masses of considerable size, and sometimes is carried on to the bladder, where it shows itself in the form of red sand. In the latter case, the alkali, then set free, immediately unites with the phosphoric or oxalic acid, most commonly the former, which is always present, and forms a phosphate or oxalate of lime. For some reason, how-



ever, yet unexplained, the phosphates rarely, if ever, concrete in the kidneys, but pass on to the bladder, where they constitute the alkaline or white sand. The presence of these deposits is easily recognised by the appearance of the excretion. Late researches go to show, that the precipitation of lithic acid depends upon the presence in the urine of a free acid, commonly the muriatic, sometimes the phosphoric or sulphuric, which acts by decomposing the lithates, and setting their acids free.

A third form of calculous disease, and by far the most painful and formidable, is that of a solid concretion in the bladder itself, constituting what is usually termed stone. These concretions are formed in the bladder by gradual deposit from the urine itself, around a central nucleus, which may be either a calculus which has made its way from the kidney, or some foreign substance introduced accidentally into the cavity. The most painful circumstance connected with this disease is the passage of the calculous concretion, when already large, from the kidney into the bladder. During this process there is fixed pain in the region of the affected kidney, with a numbness of the thigh on the same side, the pain alternating with a sense of weight in the part. The pain is acute, and accompanied with nausea and faintness, from the time when the calculus has entered the ureter, until it enters the bladder; after which, there is a remission. If the stone should fortunately become engaged in the urethra, after reposing for a time in the bladder, its farther passage is attended with some pain; but the nausea that accompanies its previous course is wanting; and the pain, instead of being deep-seated, is referred to the opening of the canal, and the actual seat of the concretion. While the stone is passing from the kidney to the bladder, the urine is usually high-coloured, and deposits a reddish sediment, not unlike coffee-grounds, the effect, probably, of altered blood flowing from lacerations of the mucous membrane of the ureter.

The presence of stone in the bladder can only be certainly determined by actual examination by a surgeon; but if, after the passage of one or more calculi from the kidney, there is experienced a permanent difficulty in the evacuation of urine, with a frequent desire to discharge it, and this accompanied with acute pain at the termination of the urethra, the presence of stone in the bladder may well be suspected. When no passage of calculus or discharges of sand have been noticed, the existence of the disease is less readily recognised, but that some cause of irritation is present, will be perfectly evident; since, in addition to the pain, it will soon be observed that the stream of water once commenced, is suddenly interrupted before its completion. As the stone enlarges, there will be a dull pain

about the neck of the bladder; while the irritation, extending itself to the rectum, will produce a straining and frequent desire to evacuate the bowels. These last symptoms do not absolutely determine the actual presence of calculus, but point out the propriety of a strict examination.

*Drowning.*—In complete suffocation from drowning, all the mental and bodily powers, the sensibility, the action of all the muscles, voluntary and involuntary, are suspended; the surface is cold, the heart ceases to beat, and no effort can detect the slightest action of the lungs.

The primary cause of death in drowning is believed to be as follows. The non-admission of air to the lungs, prevents the necessary changes in the blood circulating in their vessels. Hence this fluid passes, in the venous state, to the left side of the heart, from which it is sent to the brain in such quantity as to destroy, or materially to impair, the vital powers.

The following are the directions given by the humane society for the recovery of the drowned. The clothes should be immediately taken off, and the body wiped, cleaned, and wrapped in dry cloths or blankets, so as to prevent evaporation, and the effects of exposure to a cold medium. The body should then be carried in a recumbent posture on the back, with the head and breast raised. As soon as it has arrived in the room for its reception, it should be stripped and covered with warm blankets. If the mouth and nostrils be obstructed, they must be thoroughly cleansed. The lungs are then to be inflated, and dry warm flannels, bags of warm grain, or bottles or bladders of warm water applied to the region of the stomach, the soles of the feet, and other parts of the body. Bleeding ought never to be employed in this stage of the process; though it may become necessary, when reaction has taken place, and the circulation has returned.

The longest period after submersion at which success from these means can reasonably be anticipated, is about fifteen to twenty minutes; but they should be tried after almost any interval, provided no structural injury has been inflicted, and there is no evidence of commencing putrefaction. The accounts which we have of recovery after eighteen, twenty-four, and even forty-eight hours of immersion, extravagant as they may be in themselves, are calculated to teach the useful lesson of perseverance, even in cases apparently desperate. The first report of the establishment for the recovery of the drowned at Paris,—one of the most trustworthy documents we possess on this subject,—gives twenty-three instances of individuals brought to life. One had been under water forty-five minutes; four, half an hour; and three, for fifteen minutes.

In all the other successful cases, the period of immersion was less than this last.

*Death from Suspension* may occur in either of three modes: first, by a fracture or dislocation of the vertebræ, whereby the spinal marrow is compressed, and death occurs instantly. This is said to have been always effected in the hands of an expert executioner at Lyons, in France, who gave to the body of the criminal a peculiar rotatory motion in falling; but similar occurrences are very uncommon. Secondly, by pressure upon the superficial veins of the neck, so that the blood is arrested in its return from the brain toward the heart. This is an auxiliary cause, no doubt, in the great majority of instances; but death may occur from this cause alone, when the cord is not tied with sufficient tightness to prevent respiration. In this case, the appearance of the face, and the general symptoms, are those of apoplexy. It is very unusual for individuals to recover under these circumstances, unless taken down very soon after insensibility takes place. We are told, however, of one or two instances, in which the victim of justice has escaped death, in consequence of an ossification of the trachea. There is also a case recorded, in which a criminal, before his execution, induced a surgeon to pass a cannula into the throat, by which, of course, the passage was rendered incompressible. After remaining suspended the usual time, he was cut down, and conveyed to the house of one of his friends; the jugular vein was immediately opened, and some blood obtained; he gave some sign of returning animation, but soon expired. Recovery is still more difficult, when, as occurs in most cases, some obstruction of the air passage is superadded. Thirdly, the usual mode in which death occurs from suspension is, as in drowning, from suffocation; but, from the circumstance already mentioned, and the local injury usually done to the parts by pressure, reanimation, after hanging, is much more rare than when asphyxia has followed on submersion. As the occasion is seldom accidental, but usually designed, in execution of the laws, or premeditated self-destruction, the opportunity of applying the appropriate means of relief is seldom offered for some hours. The treatment, in cases of death by suspension, should be, in most respects, similar to that already advised for cases of suspended animation; but, in the former, venesection affords, perhaps, a somewhat better chance of success, than in the latter class of accidents.

## CHAPTER III.

### DISEASES OF MARRIED WOMEN.

IN the chapter on Hygiene we offered some remarks on the subject of marriage. Supposing this ceremony to have been accomplished, it is now proper to impart some instruction to those who are anxious to be the parents of vigorous offspring. To promote this object, both parents should be in good general health; but the lady will claim our more especial attention in this chapter, as she is to be intrusted with a most sacred charge—the germ of a new being, whose destiny she cannot foresee, but whose position and usefulness in life will not be lightly influenced by her prudence or indiscretion.

As it is our earnest desire to confine ourselves to the communication of information calculated to prove of real and practical value, and fitted for the class of readers to whom our remarks are addressed, we shall avoid, as impertinent to our object, those matters which are merely speculative, or adapted solely to the professional student.

*On Pregnancy, and the Position and Connexions of the Child in the Womb.* After the fœtus has been lodged for some time in the womb, and the several parts of its body and appendages have had time to become partially developed, it is found floating in a large sac, composed of three thin membranes placed one upon another, which line the whole interior of the womb, and enclose a large amount of a peculiar serous fluid, in which the fœtus swims.

At one spot on the outer surface of the external membrane, we find a large, thick, spongy, circular body, composed of innumerable ramifications of blood vessels, which is really a vascular development of the membrane itself, and lies in immediate contact, but is not amalgamated with the inner sur-



face of the womb. This is the *placenta*, or *after-birth*. From the navel of the infant, to near the centre of the after-birth, we find a long tendinous cord, which is twisted, like a rope, and encloses within its substance, three great blood vessels; two of them termed the *umbilical arteries*, and the third, the *umbilical vein*.

The child in the womb cannot breathe the air; and its lungs, even when fully developed, cannot contribute to the function of respiration; yet its blood requires the same change as that of animals after birth. (See *Circulation*.) This is effected in the following manner. The blood in the *fœtus*, as it courses through the route of circulation, is made to pass through the umbilical arteries, which convey it to the after-birth, where it is distributed through the exceedingly thin terminal branches of these vessels, and comes *almost* into contact with the blood of the mother in the minute arteries of the womb. It there extracts from the latter the materials necessary to fit it for nourishing the body, and parts with such as unfit it for that process; in other words, the *fœtus breathes* the blood of the mother! and the after-birth is a kind of external, temporary lung, by means of which the child respire, much as certain reptiles do, which dwell perpetually in the water.

The attachment of the placenta to the womb, has been compared to that of the little piece of wet leather which children call a sucker, and apply closely to bricks or other solid bodies, to lift them by atmospheric pressure. The umbilical cord corresponds to the string which is fastened to the centre of the leather, by which, when traction is made in a direction nearly perpendicular to the surface of the leather, great force may be applied before the adhesion will be separated: but should separation occur between a considerable part of the surface of the placenta, and the corresponding part of the womb, the attachment becomes enfeebled, and little force is then requisite to complete the separation. We see, therefore, that while the development or growth of the placenta advances in proportion to the expansion or development of the womb, the adhesion remains strong, and the necessary and important changes in the circulating fluids of the child take place in this organ. But if any disturbing influence operate upon the muscular tissue of the uterus, to excite it prematurely to contraction, its connexion with the placenta is liable to be disturbed; and, if any portion of the surface of the latter be detached, we shall not only have hemorrhage from the maternal vessels opposite to this detached portion, but the *fœtus* must suffer for want of that nutriment, which is as essential to its growth and health as atmospheric air is to the respiratory animal. In this man-

her, if the *fœtus* do not wither, its structure will be rendered imperfect; and if premature birth do not follow, it may be born at full time, but in a state of disease or deformity. From similar causes, it sometimes falls an early victim to chronic disorder; such as consumption, diseased spine, or hip joint, and scrofula. Even if the unfortunate infant should reach adult age under all these disadvantages, it may entail upon its offspring the diseases acquired in its embryotic state. The mother does not always escape the consequences of this separation of the placenta: she may be very much exhausted by the discharge of blood at the time, whether abortion take place or not; and the unnatural drain from her system sometimes subjects her to protracted diseases of various kinds; and it has been observed, that women who thus suffered once, are subject to repetitions of the same accident, in subsequent pregnancies. Although it is difficult to establish such general rules, we might, perhaps, assert that a female is more exhausted by the effects of an abortion, than she would be by three successive labours at full time, and at seasonable intervals.

We have made these remarks, with the view to explain the slight mode of attachment between the ovum and uterus; and when we consider the amount of blood which must circulate through the latter, to supply the wants of the *fœtus*, we must regard the safe keeping of the ovum as a matter of very great importance to the mother. Both her moral and physical condition should be carefully regulated, and kept free from any excitement by over-exertion, excessive indulgence in eating or drinking, sudden changes in dress, &c.; while every care should be taken to cultivate cheerfulness and tranquillity of mind. Her imagination should be as little excited as possible.

The new action which the womb and its blood vessels assumes in consequence of conception, is very often the cause of disturbance to the functions of other organs; and hence the nausea and sickness of the stomach, especially in the morning, the capriciousness of the appetite, and the frequent desire to eat substances usually regarded as every way unsuitable for food; such as charcoal, dirt, putrid meat, &c. The nervous system becomes disordered; hence the neuralgic pains, in the face or teeth. The temper is often petulant and morose, and in some cases the intellect becomes manifestly deranged.

In many females, we observe, during pregnancy, a strong disposition to plethora or fulness of the blood vessels, and inflammatory diseases; but this is far from requiring, universally, the abstraction of blood; an opinion which has hitherto been so popular that almost every female seemed to consider pregnancy and blood-letting, as necessarily associated. We do not hesitate to admit that, under these circumstances, some indi-

viduals require the use of the lancet, or some other means which will lessen the plethora; but we deprecate as injurious its indiscriminate employment in every pregnancy, and we believe that a steady attention to diet, exercise, and the state of the bowels would generally render it unnecessary.

Pregnancy is very often attended by constipation of the bowels; and some females, from ignorance or neglect, too frequently allow very large accumulations of hard fecal matter to fill up the rectum: these may sometimes become sources of irritation, capable of exciting premature uterine contractions, as well as a distressing bearing-down pain in the lower bowels: they are also prone to cause the formation of piles, which often prove extremely troublesome.

As we have already said, the digestive functions often share in the disturbance produced by pregnancy; hence flatulence, heart-burn, &c.; which occasion such distress, that the patient will often seek relief by any means proposed, however ill-advised.

As pregnancy advances, many females are extremely fearful about the effect of the imagination upon the child; and if they meet with any untoward accident, or become suddenly frightened at any object, they conclude that an image of that object is immediately stamped upon the person of the fœtus. If a strong desire be felt for fruit, fish, or any other article, the mother eagerly infers that, if unsatisfied, the infant will be born with the figure of the thing desired, impressed upon some part of its surface. On the other hand, if the child be born with any peculiar accidental mark, exuberance, or deficiency, the memory is tortured to recall some cause for the appearance, of a similar character to those above noted.

That strong impressions upon the feelings of the mother will produce a prejudicial influence upon the health of the child, is indisputably true; and although the laws of nature are altogether opposed to the doctrine of mother-marks just mentioned, the prejudices of the ignorant upon this subject may be attended with some benefit to woman kind, by securing more caution in the treatment of women during pregnancy.

If we except the errors of diet resulting from these notions, no great evil can be produced by them; and as it is utterly impossible to eradicate them from the minds of nurses, and many other kind and careful people, the medical philosopher, in addressing popular readers, must even be content to let them enjoy their reign.

*Constipation.* For the all-important duty of regulating the discharge from the bowels, we should depend, as much as



possible, on opening articles of food. If a daily effort at stool soon after breakfast fail to effect the purpose, the use of bran bread, and a little laxative fruit, such as apples, figs, or prunes, every day, will often succeed; and it is only when these means fail, that we should employ magnesia alone, or mixed with sirup of rhubarb, in a little lemonade. Pills of rhubarb and Castile soap, or castor oil, may be sometimes taken with propriety, to restore the daily evacuation; moderate doses of cathartics, only, should be given in cases of pregnancy.

*The heart-burn* is extremely apt to be induced or aggravated by constipated bowels and improper diet. Let those, therefore, who would escape so severe an affection, study the kind of food which is most easy of digestion, and does not produce acidity of stomach; an affection of very frequent occurrence in pregnancy.

The food of pregnant women should be simple, without much variety at the same meal, free from much spicing, and not consisting of too large a portion of animal substances. The breakfast should consist of stale, well made bread, with good butter, a little relish of dried beef, ham, &c., with a moderate amount of milk, coffee, tea, or chocolate. If the patient be very far advanced, it is improper for her to stoop much; and if she be harassed with the "morning sickness," it is, perhaps, better that she should take her breakfast in bed, or rather that she should at least eat a little solid food before she rises. By a precautionary indulgence of this kind, we have known persons who had been previously much distressed with nausea in the morning, to be quite relieved.

The dinner should consist of a moderate quantity of animal food, plainly prepared, with the addition of such vegetables as will not cause flatulence. Satiety should be carefully avoided, as it is often followed by oppression, particularly in the advanced stage of pregnancy. The drink at dinner should be water, molasses and water, or milk and water. Wine, brandy, cider, porter, ale, and beer, should entirely be dispensed with, unless prescribed by a physician.

The evening meal should always be light, composed of weak tea and coffee, plain bread and butter, with a relish of dried beef, ham, or fish. Hot bread or cakes, with melted butter, are highly objectionable in any stage of pregnancy. Few stomachs can digest them comfortably when in perfect health; and when this important organ is disturbed by pregnancy, great inconvenience is liable to result from indulgence in this kind of food. Late and hot suppers should be positively prohibited.

Let the evening be passed tranquilly in the midst of the



domestic or social circle, free from any stirring emotions, especially avoiding the throng of the theatre and ball-room. Her own home, in the midst of substantial domestic comforts, is every way best adapted to a woman in this situation. There is often a sense of great languor and debility experienced by females, during some part of gestation; we would, however, advise them against too much indulgence in warm feather, or down beds, as by this means the system may become greatly relaxed and enervated: moderate exercise in open air, either in a carriage or on foot, is far better than a state of inactivity or indolent indulgence. The females of the labouring classes, who are able to command plain but wholesome food, but are obliged to use considerable exercise, usually enjoy better health, and transmit to their children more vigorous constitutions, than those of luxurious society.

The political economist is perfectly aware that, while the offspring of the wealthy and hyper-refined become depreciated in physical and intellectual vigour, the children of those who, in the middle path of life, inherit the corporeal energies, and imitate the frugal habits of their parents, will rise to the highest ranks of the community. Let then that female who honourably aspires to transmit through a long line of posterity the impress of her own virtue, train herself for the important function of giving birth to, and educating healthy children. Let not wealth be apology for luxury, but let her lay aside every indulgence which would enervate her physical or depress her mental powers.

*Approach of Labour.* Of this period the patient will probably be apprized not only by her careful calculation that her "full time has expired," but by certain sensations of uneasiness about the lower part of the abdomen; a sinking down of the tumour which had been encroaching upon the region of the stomach; attacks of strangury or suppression of her urine; and, perhaps more frequently, a disability to retain it. She has at this time a strong sense of the necessity of evacuating the bowels; which are sometimes in a laxative, though more frequently in a very costive state. There is also generally a discharge of mucus, tinged with blood, from the vagina. The uneasiness and anxiety now commonly become very great, and unless the patient possess much moral fortitude, she is apt, on the increase of these symptoms, to be affected with restlessness and fretfulness to such an extent as to super-induce febrile action, requiring restraint in a cool room, and the use of cold and laxative drinks. If there be headach with throbbing in the temples, the loss of a sufficient amount of blood to restore tranquillity may be required.

By this kind of treatment, the pains and other symptoms are relieved for some time; and if the period of gestation be not completed, the relief will frequently continue till its termination; when there will be a recurrence of the same phenomena, and the patient should hold herself in readiness for an early labour. Her personal attire, and the furniture of her chamber, and bed, &c., should be arranged. For this purpose she should be provided with a loose wrapper, of a texture adapted to the temperature of her room, the under-dress should consist of a simple chemise, and a petticoat, which should be easy to slip off when necessary; she should have stockings without garters, and slippers on her feet: in this dress she may be allowed to move about as long as it is prudent for her to be out of bed; but when she is placed upon it for delivery, she should substitute a short night gown for the long wrapper. The chamber should be well ventilated, and properly warmed in cold weather. The windows should be so constructed that the air and light may be admitted when needed, and excluded when unnecessary. If the labour take place at night, the lamp should be concealed behind some object, so that the persons in the room may be merely able to see their way about the room. Every thing should now be so conducted as to inspire the woman with courage and tranquillity; and for this purpose the narration, in her presence, of unfavourable or tedious cases, of instrumental deliveries, &c., should be conscientiously avoided. Her bed should be placed with its foot and both sides at some distance from a wall, that the attendants may have a free passage about it, and the patient may enjoy the fresh air. A mattress is decidedly preferable at any season of the year; but if not at hand, such other bed as the patient possesses, should now be adjusted with the greatest regard to her present and future comfort. Let it be laid smoothly over the whole sacking bottom, and on its centre place a piece of oiled cloth, say a yard square, or more; or, a blanket, or comfortable, as is most convenient, may be folded up and placed on the bed. Upon this cloth, lay the sheet or blanket on which the patient is to be placed after delivery. At the foot of the bed, and when practicable, at the right corner, let a similar arrangement of oil-cloth, or doubled bed-clothes be made. On this latter, the patient is to lay during the delivery. About the middle of the right side of the bed, a sufficient number of pillows should be placed for the comfortable support of the patient's head. To the bed-post against which the feet are to be applied during the pains, a strong band or towel, a sheet, handkerchief, skein of yarn, or something of the kind is to be fastened, which the woman is to lay hold of when she makes an effort. Some loose light covering should be at hand, for her

protection when in bed. While this preparation is being made, the patient may be allowed to place herself in any position she prefers; either to walk about the room, sit in her chair, or take her pains in a kneeling position, as is most agreeable to her. Strict inquiry should now be made into the state of the bowels and bladder; and if they have not been freely evacuated, by efforts which she has been forced to make, she should take a dose of medicine, when there appears to be time sufficient for the purpose. An ounce of castor oil will answer; or, if the pains be urgent, we may give a large injection of a solution of Castile soap, or of molasses, with oil or lard and common salt, of each a table-spoonful, mixed with a pint and half of water.

This measure will very frequently cause a full evacuation of the bladder; but if such a discharge do not occur, either from the action of the injection or in the natural way, the catheter must be introduced. This operation should be left in professional hands, and we shall not attempt to describe it.

*Of Labour.* As it forms no part of our design in the present work to encourage the rash attempts of the ignorant to meddle in matters beyond their depth, we shall carefully confine our remarks to those subjects which may call for and *warrant* the action of nurses and friendly attendants, whether in the ordinary progress of natural labour, when medical aid is at hand, or in emergencies, where it cannot be obtained.

When the pains begin to be frequent, and pressing—it is time to send for the accoucheur, whose services, let us mention, ought in courtesy to be bespoke not less than three months before the full period of pregnancy. But as the practitioner cannot always be obtained at a moment's notice, and there are other things besides *Time and Tide which wait for no man*, the following directions may prove serviceable when women are confined, by necessity, in the absence of any experienced attendant.

The bed having been arranged as already directed, (p. 519) the patient should be placed on her left side, with her dress rolled up, or folded under her hips, that it may be kept dry. The limbs should be drawn up towards the abdomen, the knees separated about five or six inches by a pillow or cushion, and the feet placed against the bed-post, while the head lies near the middle of the bed, supported by pillows at the height most agreeable to the patient. The hips should be brought within a foot of the lower edge of the bed; and the band, towel or skein of yarn already spoken of, should be placed within reach of the patient, that it may be laid hold of, whenever the pains induce her to seek such support. It should be impressed on the minds of all, however, that the straining exertions to assist na-

ture which are often recommended by ignorant nurses, are never proper, and often highly injurious. The support afforded by the band or towel, should never be permitted to tempt the patient into powerful bearing down efforts.

When the labour pains, at first sharp, cutting, and grinding, provoking a disposition to scream, become more supportable, and induce the woman to hold her breath, and make efforts to bear down, uttering, perhaps, occasional groans, we know that labour is advancing; and it is time to place the patient in bed, though the attitude above described, need not be assumed so early. Not long after the pains undergo this change, the membranes of the sac which contains the fœtus are ruptured, and the contained fluid escapes, often much to the alarm of the patient. Sometimes the membranes may give way long before this time; or they may be so firm as not to yield until they have distended the vagina, unless they be ruptured by artificial aid: this assistance may be safely given, whenever the bag of waters appears at the external orifice. By this time the head has generally passed so far through the pelvis, as to rest upon the perineum, which condition marks the beginning of the third stage: in this, the pains usually become more severe, as the external parts are subjected to greater distention.

When the head is about to escape from the vulva, the suffering of the patient is generally very acute, even when the labour has been tedious, especially if the parts have been fretted by frequent examinations, which too frequently excite an inflammatory disposition in these parts, and arrest the healthful secretion of the mucus which is designed to relax and lubricate the passage.

It is at this time, therefore, that the most careful attention should be bestowed upon the perineum, which is exposed to danger. This part should be freely lubricated with lard, or some animal oil; after which the attendant should be prepared to support it, during the expulsion of the head, by applying to it the palm of the hand, covered by a soft towel, and making gentle pressure till the head has passed.

The patient ought to be soothed and tranquillized as much as possible; for the intelligence that the head is born is often so pleasing, after a rending pain, that she will weep. Two or three lighter efforts of the uterus, without any aid from the mother, now complete the third stage of the labour, and the delivery of the child. Let us here repeat our caution, that interference with the progress of this stage is injurious. Any effort on the part of the attendants, suddenly to withdraw the child from the body of the mother, may be very prejudicial; for it is important that the uterus be allowed to contract gradually, so as to expel the child by its own unaided efforts. The



only business of the attendant, at this moment, is to place a hand under the body of the child, and conduct it safely along the surface of the bed, keeping its mouth, in the mean time, entirely above the discharges which may be found on the bed. Its head should be covered, except the mouth, which should be freely exposed to the air until it breathes and cries, and until the pulse in the navel string has ceased, or has become very feeble. Then the navel string should be tied very tightly, with a thick, and pretty strong string, about three inches from the child's abdomen; it may then be cut about half an inch above the ligature. After ascertaining by careful inspection, that the ligature has entirely arrested the flow of the blood from the cut surface, the child should be laid in a flannel, or soft muslin cloth, and given to an assistant. The labour, which before engaged the whole attention of the mother, is now apparently, forgotten, all her complaints have ceased, and she lies quiet, unless active in giving directions about the dress of her babe, until after a few minutes, she feels another slight pain, which excites some alarm, unless its cause is explained to her. This is an important moment with a well-instructed attendant, who is aware of the hazard into which a patient may be thrown by mismanagement or neglect. The uterus, which has been firmly compressed about the whole ovum until the rupture of the membranes, has now become suddenly emptied of every thing but the placenta and membranes. From the surface of the womb, hemorrhage, to a greater or less extent, will follow, unless the contractions of the uterus have closed up the orifice of the vessels. To prevent mischief of this kind, a hand should be conveyed beneath the bed-clothes, and placed upon the abdomen of the patient; and frictions should be made over the region of the uterus, until the organ is felt contracted into a hard tumour just above the pubes. *No effort should be made forcibly to extract the placenta, unless the precautionary friction has effected a decided disposition in the uterus to contract upon it.* The cord may then be embraced in the fingers of the other hand, and a very gentle traction may be made; the cord being carried backward as far as possible toward the perineum, if the placenta be high up in the pelvis, and more forwards toward the thighs, if it be near the external parts.

The patient usually feels some slight pains during the expulsion of the after-birth. When the mass of it has passed the vulva, it should be carefully twisted two or three times upon itself, that the membranes may be more certainly brought away entire. As soon as this is done, it should be removed in a suitable vessel. A soft cloth should then be placed gently against the vulva, the pillow removed from between the knees,

and the patient allowed to straighten herself out on the bed. A bandage, ten or twelve inches in width, and long enough to surround the waist, should be applied under the hips and back, then brought round to be fastened in front, just above the pubes, and along the middle line of the belly, to give uniform pressure to the whole abdomen. If there be any disposition to hemorrhage, it will be proper to apply a few folds of compress upon the pubic region, beneath the bandage, to prevent the womb from being distended with blood.

When this has been done, the patient, if fatigued or debilitated, should be allowed to remain for some time at rest, without being drawn up in bed; but if not so to any considerable degree, she should be gently slipped up to her proper position, all the wet clothes removed from about her, and the articles of dress which have been folded up above her hips, spread about her lower extremities. It is not unusual for women at this time to have a shivering, and apparent chill; when this occurs, they should be well covered up, and allowed some moderately warm gruel or panada, free from any stimulating liquors, the room should be made quiet, and they should be allowed a little repose.

*Management of the Child.*—Mean while the child will require attention. A basin of tepid water with fine soap, and a cup of lard should be at hand, for the necessary ablution. It is usual for children to be born with a considerable quantity of sebaceous matter upon the skin, which the nurses find difficult to remove by the ordinary modes of washing; but if the body of the child be well anointed with lard, it is very easily taken away by a subsequent washing with soap-suds. The towel which is used in washing or wiping, should be soft and pleasant. We have seen some careless nurses use coarse crash towels, with which they would almost peel off the cuticle, regardless of the cries of the child. The navel is to be dressed by taking a little fine linen rag, and having doubled it two or three times, a perforation is to be made in its centre, through which the cord is to be passed; the linen is then to be folded neatly around it, and placed on the middle line of the abdomen, towards the child's chin; over this is applied a broad flannel bandage, extending from the hips to the armpits, overlapping a little in front, that it may be readily secured by tape or braid strings. This bandage should be *moderately* tight. We have seen children so girdled that they could scarcely breathe, and would have died, if the bandage had not been very soon slackened! The rest of the dress should be loose and easy, but may in other respects be made to suit the taste of the mother.

It has long been the custom of nurses literally to cram the infant with panada, gruel, or tiff; and even at the present day

it is said, a little molasses and water are necessary, "to purge off the economy." But nature, mostly provident of her offspring, supplies the only true source of nutriment and physic in the mother's breasts. To these, therefore, let the child be applied, as soon as it is dressed, and the mother a little refreshed. The advantages to be derived from this course are such as to compensate the mother and nurse for their early pains. The child, by this means, clears the mucus from its mouth in the effort at suction. If it draw any fluid from the breasts, this commonly purges it sufficiently. By the suction, the breasts are also excited into action, the nipple becomes erect, and milk flows readily, much sooner than if they were kept in a quiescent state for several days. We believe we may safely state that, after attentive observation for several years, we have never known a case of milk fever or milk abscess, in a person who has used the precaution of an early and persevering application of the child to her breasts.

After difficult labours, when the head of the child has been long locked between the bones of the pelvis, it will frequently be moulded into a conical shape, with the bones in some measure over-lapping each other. This appearance usually alarms inexperienced mothers and nurses, who think it necessary to set about correcting the defect. Nothing, however, should be done in such cases; for, if let alone, the parts will be restored to their proper form in the course of a few days. If, however, the scalp is very much bruised or swollen, a cloth wet with vinegar or diluted spirits, may be laid over it.

Some children are born apparently dead, when, by a little care, they may be resuscitated: for this purpose, they should not be separated from the placenta, by dividing the cord, while there is any pulsation in it, and the children are feeble and pale; but if they be purple or livid, the cord should be cut, and an ounce or two of blood abstracted from the foetal part of it; care being taken to apply a ligature securely around it, as soon as it has bled enough to relieve the child from this apoplectic state. This treatment, however, is hardly safe except in professional hands. The child should next be taken from the bed, and laid in the lap of an assistant near the fire, wrapped in warm flannel, and its whole body very gently but briskly rubbed with a piece of the same cloth, wet with warm spirits: the soles, palms and back, should be rubbed with a soft brush; the throat of the child should be carefully examined, and if it contain mucus, this should be cleared away by a soft rag, wrapped upon the end of the little-finger. A little ammonia, or some other pungent volatile substance, may then be held near its nose or mouth, or a small quantity may be rubbed on the tongue. If this do not succeed in soon pro-

voking an effort to sob, artificial respiration must be attempted. For this purpose, the nostrils should be closed, and air breathed by the attendant into the mouth of the child, and thus into its lungs; this is to be gently pressed out again by the hand of the operator, and the operation repeated several times, at intervals of a few seconds. In a case of asphyxia, which came under our care, the heart continued to throb for nearly thirty minutes, while we employed artificial respiration, though it ceased as soon as we remitted our exertions in the least degree. In addition to the above means, warm injections thrown into the bowels have been very useful.

Instances are recorded in which respiration has been established even after the interval of two hours from the birth of the child. A faint sighing, or a full pulsation of the heart, are the first signs of returning life. They should be encouraged by gentle perseverance, but always without any harsh measures.

*The After-treatment of the Lying-in Female* should be mild. By careful attention to the diet, bowels, bladder, and breasts, she will usually escape any indisposition. As a general rule, she should have her bowels opened by a dose of castor oil or magnesia, about the second or third day. After this, if the diet be of the proper kind, the bowels act for themselves; but if they do not, either oil or magnesia, or, if there be a little disposition to fever, a Seidlitz powder may be given every other day. The patient should be kept quietly in bed for the first three or four days; after which, she should be allowed, under favourable circumstances, to sit up in bed, or even to leave it for a few minutes that it may be made up. The parts which have been recently too much distended should be washed with tepid water, which will be not only very refreshing, but prevent the accumulation of any of the lochial discharge, that continues for some time after delivery. After-pains, which seem to arise from continued contractions of the uterus after the expulsion of the ovum, rarely succeed a first labour: but in subsequent labours, they sometimes become very annoying. They may be mitigated by twenty or thirty drops of laudanum, or one-eighth of a grain of the sulphate of morphia, every two or three hours: or sixty drops of the former may be given in an ounce or two of starch water, as an injection. After the fourth or fifth day, the patient may be permitted to assume more frequently the sitting posture, and to indulge in food of a more nutritious kind, but she is constantly to remember that parturient women are very liable to attacks of inflammatory diseases, especially after the use of stimulating food or drinks.

*Of Rupture of the Uterus.* Either from deformity of the pelvis, from some imperfect or irregular action of the muscular fibres of the womb, or from some diseased condition of its



structure, it is liable, during labour, to be lacerated in some portion of its substance, so as to permit the escape of the child into the cavity of the abdomen. The accident may happen at various periods of labour, and has even been known to occur during the last pain which delivers the child. This unhappy circumstance is indicated by a sense of something giving way internally, preceded by a very severe pain, generally mistaken for a cramp, and immediately followed by a sensation of great languor and debility; a speedy and, sometimes, instantaneous vomiting of the food previously taken, or of a brownish, coffee-coloured fluid; a very quick, weak, fluttering pulse; cold sweat; difficult respiration; and an instantaneous cessation of the labour pains. Through this laceration, either a part, or the whole of a fœtus may pass. There have been instances in which the head has been retained in the cavity of the pelvis, whilst the body and the lower extremities were found in the cavity of the abdomen. The *peritoneum* is not invariably lacerated, even when such protrusion takes place—nor does this species of accident always cause the death of the patient. Cases of this kind are, of course, beyond the aid of any but the most able practitioners, and cannot be treated by popular skill.

*Uterine Hemorrhage.* Let us suppose the delivery of the child happily completed, and both the patients and her friends expressing their satisfaction. In the midst of these seemingly happy circumstances, the former may cry out, “Doctor! I am sinking! I’ve a great discharge!” On examination, the practitioner is startled to find his patient drenched with blood, escaping in such quantity, as not only to flood the bed, but, perhaps, to form a puddle on the floor! In other cases, there may be no external discharge, but the cold skin, pale visage, eyes rolled up, and the exclamation “How the room turns round!” all speak the mischief which is going on within. The vessels of the surface of the uterus are bleeding with open mouths, either in consequence of a partial separation of the placenta, or a want of tonic contractile powers in the fibres of the womb.

In this condition, not a moment is to be lost. If no physician be present, and the placenta be undelivered, an experienced nurse may venture to introduce into the passage the fore-finger of her right hand, well coated with lard,—back, palm and all.—If the after-birth be found chiefly in the vagina, she may introduce the whole hand, and passing her fingers to the open neck of the womb, she may remove it, if this can be done without force, by pressing it down from above, while she draws gently on the cord with the other hand. But if she meet with resistance from the part of the placenta within the womb, or

if no considerable portion of the former be found within the vagina, then the hand must be withdrawn.

When the after-birth is retained partly or wholly within the womb, during uterine hemorrhage, it should be as little disturbed as possible, until the organ contracts sufficiently to expel the placenta entirely into the vagina. This contraction may be safely promoted by the following measures: First, by friction steadily made with the hand above the pubis, and frequently patting the same part in a gentle manner. This is the feeblest measure, but it will often succeed in mild cases, and is a valuable assistant to other means. Secondly, by the exhibition of twenty grains of ergot in a gill of water every half hour. This should not be continued beyond the fourth dose. It often acts very powerfully. Thirdly, by cold affusion on the surface of the abdomen, by pouring upon it, from a considerable height, a stream of cold water. This is best accomplished by employing a pitcher or tea-pot for the purpose. The impression should be sudden, so as to secure a decided shock. It is a powerful remedy.

The art has other and more certain resources; but as they can only be safely directed by professional men, we shall not attempt to describe them here. Even after the placenta is delivered, there is no absolute safety, until the uterus can be felt, firmly contracted into a hard, round ball behind the pubes. In some instances, after copious hemorrhages, which have been, in great degree, arrested by the uterine contractions, there remains a slight dribbling of blood, proving a source of exhaustion and subsequent ill health. This discharge often yields to the employment of cool astringent injections, which may be safely employed, when the general health of the patient has been good. Among the best of these are lead water, and the solution of alum. Muriated tincture of iron, greatly diluted, is employed as a powerful remedy by practitioners, but it is not a safe article in unprofessional hands. The after-treatment of the debility occasioned by the hemorrhage, should be conducted on the same general principle. This diminished discharge sometimes yields to the internal use of two or three grains of sugar of lead, or the same quantity of ergot, administered every two or three hours, during one or two days.

*Of Puerperal Convulsions.* There is another class of affections, of a most terrific nature, to which women are occasionally liable, generally about the parturient period; though, sometimes, before the time of confinement, and, in a few instances, shortly after delivery: we mean *puerperal convulsions*. This terrible class of maladies is most commonly manifested in first pregnancies.

Affections of this character appear under several varieties. They are either apoplectic, hysteric, or epileptic, each of which forms is preceded by peculiar symptoms denoting its approach. The apoplectic species is generally ushered in by a strong determination of blood to the head, with an engorgement of the vessels, more or less severe headach, ringing in the ears, loss of sight, giddiness, &c. These precursors often continue but a very short time before the convulsion is ushered in by coma and stertorous breathing. In some cases the patient has suddenly cried out, "My head!" "my head!" has become convulsed, and died in a few hours.

In the epileptic variety, these premonitory symptoms may be present several days before the convulsive movement becomes very conspicuous. There is, during the paroxysm, a perfect suspension of all consciousness; for, when it has passed over, the patient is not aware of what has happened. She may look around the room, apparently in a state of surprise, then gradually sink into another convulsion of more or less intensity.

The epileptic variety of puerperal convulsions is not preceded by that peculiar creeping sensation along the limbs and back, which is so often felt before an attack of common epilepsy; but, in other respects, the former resembles the latter very closely. The face is swelled, and the countenance is contorted by twitches which contract the muscles suddenly and in all directions, while the eyes are rolled about with great rapidity, and the tongue protrudes and becomes black. The whole body is violently agitated, though sometimes one side is more affected than the other. Respiration is alternately hurried and suspended, and the accumulation of saliva about the teeth causes a hissing sound in breathing. The pulse is at first full, frequent, and tense; but quickly becomes rapid, small, and almost imperceptible. During the paroxysm, the urine and feces often escape involuntarily; and the attack usually declines with a cold, clammy sweat, covering the whole body of the patient.

In the hysteric form of this disease, the headach, if present, is neither so severe nor permanent; there are ringing in the ears, hysterical ball, and palpitation of the heart. The face is not so much convulsed; the eyes do not vacillate so much, though there is more violent contraction of the large muscles of the body; the countenance is less flushed than in either the apoplectic or epileptic variety; there is rarely much frothing at the mouth, nor is there any hissing sound in breathing, and the pulse is less disturbed. This last species of the disease is more prone than any other to attack women

of delicate nervous habits; who, however, generally recover from it more rapidly than those affected with either of the other varieties.

There are several other forms spoken of by different authors; as the tetanic, cataleptic, &c., all of which appear to us to be but grades of the same terrible disorder, requiring merely a slight modification in the treatment. There is, however, a species of convulsion, mentioned by a late practical writer, occurring under circumstances entirely different: we mean the anemic convulsion, in which powerful muscular efforts take place after the system has been almost drained of its blood by uterine or other hemorrhages.

Puerperal convulsions arise from a variety of causes. It is well known that, during gestation, there is in most women a greater than ordinary disposition to plethora, as well as to nervous irritability. In most instances of this disease, there is a great determination of blood to the head, evinced even for some time anterior to the attack. The efforts of the patient during labour, as well as the interruption to the free circulation of the blood through the lower extremities, in consequence of the pressure made upon the blood vessels by the enlarged womb, are obvious causes of the apoplectic variety; while a certain degree of plethora, complicated with nervous excitability, may induce the epileptic form of the disease. On the other hand, the hysterical form probably depends entirely upon the exalted sensibility of the nervous system; as do also the tetanic and cataleptic varieties. The treatment of this disease, therefore, must be modified by the circumstances which contribute to its occurrence.

In the apoplectic variety, the lancet should be freely used, and blood drawn copiously from the general system. Cold should be kept about the head, whilst powerful revulsives, such as strong mustard plasters, should be applied to the lower extremities. If the patient can be made to swallow ten or fifteen grains of calomel, followed by an active dose of the infusion of senna, it should be promptly administered, and the operation quickened by free injections of senna tea, or other powerful purgatives. Opiates, or narcotics, in any form, are highly prejudicial in this species of the disease, unless after much depletion, when the case becomes resolved into one of nervous excitement alone. The same course is to be pursued in the epileptic form, except that depletion need not be carried quite so far, and anodynes and anti-spasmodics may be administered rather earlier, and in conjunction with the other measures.

In the hysterical variety, vascular depletion is less necessary, and may be often dispensed with altogether. A brisk purgative



combined with an anodyne or antispasmodic, such as Hoffman's anodyne, or asafoetida, with revulsive applications, are generally sufficient to restore the regularity of the nervous action.

Of the tetanic, cataleptic, and anemic varieties, we know very little; but should we meet with them, we should be disposed to treat them in nearly the same manner as other forms of the disease.

In some cases it is proper to deliver the child immediately, by artificial means, when puerperal convulsions occur before the birth of the child; and there are not wanting instances in which the life of the child has been sacrificed to save that of the mother, under such circumstances. But the fearful responsibility assumed by those who dare to act as the arbiters of life and death, confine the practice within the highest walks of the profession.

*Inversion of the Uterus* may be partial or complete: in the latter case, the whole organ becomes turned inside out, exposing its internal surface. The whole mass may either be thus presented at the external orifice of the vagina, or, if not very large and engorged, may be concealed within that canal.

The symptoms attendant upon this event, are severe and distressing pain about the region of the uterus; an effort to force or bear down, nausea and sometimes vomiting, great faintness, with more or less hemorrhage, cold clammy sweats, and a pulse small, frequent, or perhaps entirely absent. The patient also suffers very much from nervous agitation of the system.

The symptoms of partial inversion are similar to those of complete inversion; but there is almost always a greater amount of hemorrhage in the former case, probably in consequence of the constriction of the orifice of the womb upon the parts which have become engaged in it, which has been known actually to arrest the circulation, and produce gangrene of the prolapsed portion of the organ. The pain suffered by the patient, is in some degree proportional to the extent of the inversion. It is comparatively slight when no part of the body of the womb has passed through the neck, and in more considerable inversions it depends much upon the tightness with which the orifice of the womb contracts.

It would be folly to enter upon the mode of treating this accident, in a popular work, except to mention that if a complete inversion of the womb should occur where no medical aid can possibly be obtained, it would be warrantable in an intelligent assistant to attempt the reduction by pressing upward the middle of the tumour with well greased fingers, and then proceeding in much the same manner as in prolapsus of the anus. After the reduction, the hand, smoothly doubled up,

should be fairly introduced into the cavity, and there retained till expelled by the contractions of the womb. It has been generally supposed that a womb completely inverted, could not be reduced; but we fear that the attempt has not been made judiciously as often as it should have been. If a few hours of time are lost, it will probably prove impossible; but we cannot perceive any insuperable barrier against success, when it is made with promptitude. Dr. C. D. Meigs has succeeded recently in one case in Philadelphia, and the ease with which the reduction is effected in the larger domestic animals is no weak argument in favour of its possibility in the human species. Complete inversion is not always fatal. There is one case in this city, in which it has existed for many years; and it is even recommended that, when incomplete and irreducible, it should be completed, to secure additional safety from the fatal effects of stricture.

*Inflammation of the Womb* may occur at almost any period; but is, of course, most frequent soon after delivery. It usually appears between the second and fifth days, inclusive. The pain in the uterus is constant and violent, but subject to considerable exacerbations. This pain is distinguished from after-pains by its constancy, and by extreme soreness on touch over the lower part of the abdomen; but the tenderness extends no farther, unless the peritoneum become implicated.

Both the milk and the lochia, (discharges of bloody serum following confinement) are suppressed soon after the attack, and general fever soon makes its appearance. This fever is rarely ushered in by a chill; it is, however, attended by headache, and if not soon relieved, by delirium. The tongue is white, furred, and sometimes dry, or covered by a clammy fluid, causing great thirst. In the progress of the affection, the back and thighs participate in the pain. Pretty severe pain is also felt in many cases on the left side below the ribs. The urine is scanty, high-coloured, and deposits a sediment: sometimes it is almost suppressed. The bowels, in the commencement of this disease, are generally bound, though in the latter stages a diarrhœa comes on, proving critical in some cases. The disease sometimes runs into suppuration, but mortification is a rare occurrence.

Active vascular depletion during the inflammatory stage is most useful: bleeding from the general system should be promptly effected; after which, the application of leeches to the vulva, groins, and, if medical aid be in attendance, even to the neck of the uterus itself, will be highly advantageous. These measures may be followed up with much relief to the patient, by warm fomentations to the parts. The bowels should be kept moderately open by laxatives or even saline cathartics.

After the febrile action has been reduced, if there remain much local uneasiness, a blister applied to the lower part of the abdomen, sacrum or thighs, will generally afford great relief. The various secretions should be restored by appropriate means, and sleep induced by opiates, after the vascular excitement has been sufficiently reduced. If there be a throbbing sensation felt in the uterus, with an irritated state of the pulse, blood-letting, if performed at all, should be resorted to with great caution; as suppuration being about to take place, the system will not bear vascular depletion. If an abscess should form, and the pus be discharged, the parts should be kept well cleansed by bland injections; such as warm gum-water, flax-seed tea, or infusion of slippery elm, thrown into the vagina by a proper syringe. Under all circumstances, the patient should be confined to the horizontal position for some time after the disease has apparently subsided, as the uterus, while remaining in a state of engorgement, will be much disposed to prolapsus or falling.

*Of Puerperal Fever.* Women in child-bed are, occasionally, the subject of a more terrific and unmanageable form of disease than that just described,—a disease which sometimes becomes epidemic or endemic, sweeping off great numbers of lying-in women, whether in the wards of an hospital, or scattered over large cities or sections of country.

This affection does not appear to be attributable either to variety of constitution, or to the easy, severe, natural, or instrumental character of the labours; but about the second day after delivery, the patient complains loudly of after-pains, and refers her suffering to the region of the pubes and uterus. She will have severe rigors, with a pulse varying from one hundred and twenty to one hundred and sixty. Both her bodily and mental energies are very much prostrated, there being an indescribable sense of distress about the chest, with a total suspension of maternal feelings. The skin sometimes becomes hot and dry, the face flushed, and the intellect evidently disturbed. Respiration is performed laboriously, and by sighs. The abdomen is so sore, that it will not bear the slightest pressure, and it is rapidly distended, till as large as it was before delivery. The stomach soon shares in this disturbance; and in the midst of the tossing and restlessness of the patient, it throws up morbid secretions, at first, of a bilious character, but afterwards, of the colour of coffee-grounds. The face assumes a ghastly appearance; there is a livid circle about the eyes, singing in the ears, headach, a pale or red tongue, and parched lips. The breasts fall, and the lochia sometimes become suppressed. The bowels in the early stage are constipated,—the urine scanty and high-coloured. The eyes be-

come dull and the pupils dilated, the features appear sharpened, the cheeks suffused with a hectic flush, the skin presents a cadaverous hue, the patient lies on her back with her lower limbs drawn up to relieve her respiration, which is greatly impeded by the tumefaction of the abdomen, and, as the affection hastens towards its fatal termination, it assumes many of the characters of the gravest forms of typhus fever. This whole round of changes from apparently safe delivery to death, has been known to be completed in thirty-six or forty-eight hours.

In a disease of so fatal a character, and involving so serious a responsibility, as that now under consideration, we shall be justified in urging the following important directions, when medical aid cannot be procured.

Let the patient, if possible, be kept in a large, well ventilated, quiet apartment, secluded from any disturbing influence of visitors: let her be freely bled at the very onset of the disease; let her bowels be thoroughly evacuated with calomel and jalap, say ten grains of each. Should not the first bleeding afford decided relief of the sufferings, direct the repetition of the operation, even though the blood at first drawn do not present a buffy coat. Whenever the pulse, by such repetition, becomes somewhat reduced in force, if the tenderness still continue, let the abdomen be covered over by a number of leeches, particularly about the affected part. After this, if the constitutional symptoms continue while the system is in a situation not to warrant farther vascular depletion, and if the stomach be irritable, administer the saline draught. If the pulse become small and somewhat feeble, give twenty or thirty drops of spirits of turpentine every hour, with the mercurial ointment, covering the abdomen at the same time. If there be a discharge of the lochia, it is almost always intolerably offensive: when this is the case, the vulva should be carefully cleansed with luke-warm water, and the clothes constantly moistened with pyroligneous acid or solutions of the chlorides of soda or of lime; or small quantities of these salts may be kept in saucers in various parts of the room, or under the bed-clothes.

The diet should be extremely light in the inflammatory stage, and confined to the following articles; namely, toast water, gum water, thin barley or rice water, lemonade, rennet whey, molasses and water, and balm tea; carefully avoiding every preparation of animal substance, however delicately prepared, so long as the patient has the slightest symptom of fever; for although chicken water may enter the dietetic list of European writers on this disease, it must be kept out of the catalogue of indulgences in the affection, as it generally



occurs in this country. To avoid fatigue from rising to receive the nourishment, it should always be administered from a sick cup or tea-pot spout. The medicine should be given by a spoon, and the discharges from the bowels should be received in a bed-pan, or what is still better, in states of great debility, an ordinary tin dusting pan, the thin front edge of which can readily be slipped under the nates of the patient without disturbance.

The bed and body clothes should be changed and well purified very frequently, as far as can be done without exposing the patient to too much fatigue. The bed-clothes should be supported above the body by a suitable frame-work, the most simple of which is described at page 327. The abdomen may be kept wet with some spirits of hartshorn, camphor, or turpentine, if it be grateful to the patient. The secretion of the breasts should be promoted by the occasional application of the child, or some other suction power, whenever this can be done without too much fatigue and disturbance to the mother.

The gradual subsidence of this state of severe indisposition will be known by the diminution of the frequency of the pulse, and an increase of its volume and force, a gentle perspiration on the whole cutaneous surface, a moderate and frequent discharge from the bowels, a restoration of the urinary secretions, tranquillity of mind, &c. The diet may be gradually increased in strength, and moderate exercise should be encouraged.

*Swelled Leg, Milk Leg, or Phlegmasia Dolens.*—This very troublesome, painful, and tedious, but not very dangerous affection, may occur to the lying-in female at an earlier or later period.

The patient, perhaps previously well, is attacked by chill, followed by fever, with pain in the hip, the groin, and perhaps the back, or the calf of the leg. In a few hours, the painful parts of the affected limb begin to swell rapidly. The swelling extends in all directions, until the member becomes hard, white, glossy, incapable of receiving an impression from the finger, exquisitely sensitive in every part, and moveable with great difficulty, or not at all.

But one limb is affected at a time, but when the inflammation begins to decline in this, it sometimes commences in the other. The swelling often affects the labium of the diseased side, but finds itself accurately bounded by the middle line of the body.

Suppuration rarely takes place in this disease, but we have seen a case of repeated ulcerations in a limb affected with chronic phlegmasia dolens.

This disease being inflammatory in its nature, requires de-

pletion for its relief. In general, a pretty free bleeding from the arm, sufficient to reduce the pulse, should be performed, the bowels should be freely purged by salts and senna, or magnesia, and if the acute symptoms be not relieved, leeches should be applied to the limb.

The farther treatment of this tedious affection need not occupy our attention, for it should be left in the hands of the profession, and it is not of that urgent character which demands the risk of trusting to less informed advisers, even when medical assistance cannot be had in reasonable time. Much good may be done by methodical bandaging, after the first violence of the disease is over; but errors in bandaging might be attended with evils worse than the complaint itself, and unfortunately, methodical bandaging, is not only above the skill of most domestic advisers, but is practised by too small a portion even of professional men.

*Of Puerperal Nervousness, Mania, and Melancholy.*—As all women are more irritable in the puerperal state, and more easily affected, both in mind and body, than at other times, they are not only more subject to inflammatory diseases, but occasionally become even maniacal, either a little before, during, or shortly after their lying-in, or, perhaps, after they have been nursing for some time. This attack of mental aberration often comes on suddenly: for example, the patient may awaken in terror out of an apparently sound sleep; or some trifling alarm may excite her very much; and, from that moment she may be more or less maniacal; her wandering mind, still harping on her child. Sometimes she is conscious of her situation, and knows that she has a strong propensity for the destruction of her own offspring. A lady, who had been strongly attached to her infant, on one occasion, while nursing it, screamed to her nurse, "Take this child from me, or I shall throw it into the fire!"

Under this mental obliquity, a pious woman will utter oaths, and use obscene language. In some instances, the derangement is evinced less in the language than in the irregular conduct. There is, perhaps, most frequently, a tendency to raving rather than melancholy. The patient always recognises surrounding objects, and either answers any questions addressed to her, or allows herself to be disturbed by them. She sometimes reasons pretty correctly on her insane idea, and can be, for a little while, interrupted in her madness, by her own efforts, or by proper management. Her face is commonly rather pallid, evincing trepidation and imbecility; her eye has a troubled appearance; her pulse becomes frequent upon the slightest nervous irritation or bodily exertion: the tongue is generally white; the skin sometimes hot, particularly at the commencement of the attack; the secretion of milk is occasionally

diminished; excepting when there has been a previous attack of diarrhœa, the bowels are confined; and, in many cases, there is decided derangement of the functions of the liver.

There appear to be two forms of puerperal mania; one attended by fever, or a rapid pulse, the other accompanied by only a very moderate disturbance of the circulation; and it is the experience of some practitioners who have had charge of both kinds of cases, that most of the latter recover, while those with rapid circulation generally die. Mania soon after delivery is more dangerous to life than melancholy beginning several months afterwards. If the patient can sleep, and her pulse becomes slower and firmer, even should her mind continue disturbed, she may recover; but, on the contrary, if she have a quick, weak, fluttering pulse, with constant wakefulness, and symptoms of increasing exhaustion, she is likely to die, even though her mental condition may be apparently improving. It is a popular impression, that intellectual derangement is almost uniformly owing to excessive action of the blood vessels of the brain. While conceding the fact, that there is an inflammatory condition of the brain attended by delirium, and that too, often of the most acute kind, it must be borne in mind that the mania which attacks women whilst lying-in, or after nursing for some time, is generally one of exhaustion of the physical energies; and that, while all moral stimuli should be carefully removed or guarded against, vascular depletion should be resorted to with extreme caution, if at all. Bleeding has often aggravated the symptoms, and has sometimes depressed the patient below the power of recovery. The bowels, being generally very much constipated, particularly in cases of attack about the period of delivery, let them be thoroughly opened by some safe cathartic pills, or by senna and salts. If there be evidence of much disturbance of the biliary function, administer a dose of five or ten grains of calomel alone, and follow it up next morning by rhubarb and magnesia, Epsom salts, or senna tea. After thus clearing out the alimentary canal, the bowels should be kept regularly excited by the compound rhubarb pill, or by the pills of aloes and asafœtida. If the patient be extremely restless and unmanageable, confine her motions by the strait waistcoat, or by binding the elbows with a strap. Keep her room dark, and exclude her friends and all persons but a nurse who can exercise a proper influence over her, and her physician; let her diet be nutritious, easily digestible, and if she have lost much blood by hemorrhage or otherwise, or if her disease have been produced by too long nursing, administer a small quantity of wine; say one or two ounces in the course of twenty-four hours.

In order to procure rest at night, the patient should take some anodyne article, such as twenty drops of hartshorn or acetic tincture of opium, or a grain of opium in a solid pill.

Thus far, on emergency, the domestic adviser may go; but if the disease continue unchecked or increasing, the farther treatment depends so much upon nice distinctions in the character of the particular case, and the feelings and disposition of the patient, that we believe it would be safer to leave the powers of nature to their course, than to place the very delicate subject under other jurisdiction than that of the profession.

*Of Palsy of the Bladder.* Some females, after the easiest as well as after instrumental deliveries, become the subjects of paralysis of the lower extremities and bladder. They are then incapable of evacuating the urine; and unless the bladder be relieved by art, it would be liable to laceration. The catheter should, therefore, be introduced at least twice a day, during the whole continuance of the disease. The patient can soon be taught to use it herself. By the free use of frictions, tonics, and exercise, the disease generally goes off in a few weeks. Some nurses are instructed in the art of introducing the catheter, which is a much easier and safer operation in females than it is in males.

*Of Swelled Throat.* In some peculiar constitutions, and from some peculiar causes, swelling of the thyroid gland (the gland which is the seat of goitre) takes place after parturition. It generally appears within a few days after delivery. Sometimes the woman feels as though something had given way in her throat; the gland may swell rapidly and enormously, giving rise to great distress, and a suffocating sensation. Occasionally it becomes inflamed, and suppurates; at other times its growth is gradual. It may then remain for a time stationary, or in an indolent state, giving rise to very little inconvenience; perhaps merely a slight difficulty in swallowing.

We have seen the sudden enlargement of this gland subside rapidly under the application of a number of leeches, and frictions with iodine ointment. Frictions with salt and water, repeated blistering, and the internal and external use of iodine, have been found useful in the chronic form of the enlargement; but the last named remedy is too dangerous to be trusted in unprofessional hands.

*Inflammation and Abscess of the Mamma.* Almost always on the second or third day after delivery, especially if the nurse have neglected the application of the child to the breast very soon after its birth, there occurs a sudden sensation of fulness in the bosom, often ushered in by chill and fever, with headach, dry skin, furred tongue, &c., particularly



if the diet or drinks have been stimulating, and the bowels have not been freely evacuated. The breasts soon become turgid, not only with milk, but blood; they are painful and throbbing, and, if not soon relieved, the pain extends to the arm-pits, the glands of which become sore, and the suffering is almost intolerable. In some women, this affection rapidly runs on to suppuration, and a part or the whole of the breast becomes involved in one extensive abscess.

If this affection be treated early, before the symptoms run high, much mischief may be prevented by administering a brisk saline purgative, such as salts and magnesia, salts and senna, &c.; bathing the breast with a sponge which has been saturated with warm vinegar, or applying a soft poultice of hops stewed in vinegar and water, and thickened with flaxseed meal or wheat bran, &c., repeating this as often as it becomes cool; allaying thirst with toast water and sweet spirits of nitre, the latter in the amount of a tea-spoonful every hour or two, till free perspiration is induced; or refreshing the patient with soda powders or saline mixture, in small but frequently repeated doses, till the febrile symptoms abate. The diet, during this time, should consist of a little thin water gruel, panada, or sago.

If the fever be high, and the pain intense, accompanied by delirium, the patient should be bled from the arm, until a little faint; and if not decidedly relieved, twenty or thirty American, or ten or fifteen imported leeches should be applied about the inflamed part, but especially at the lower edge of the tumefied breast—the bleeding from these should be encouraged by cloths wrung out of warm water. The purging should be kept up by a repetition of the salts or magnesia, if necessary.

The inflamed breast should be frequently examined, especially when the pain is of a throbbing kind, as abscesses are very likely to form deep in the substance of the gland, and if not soon opened, they sometimes form suppurating passages, running, to a great extent, under the surface. Generally, however, the abscess is more superficial, and readily points outward. If the abscess be small and superficial, it is commonly deemed advisable to permit it to burst spontaneously; but when the disease is extensive, so much of the substance of the breast is liable to be involved, that surgeons prefer making an opening with a lancet as soon as the formation of pus can be ascertained. When the disease is deep-seated, involving the substance beneath the gland, great adroitness is requisite to discover the existence of pus, and the proper time and place for making an opening through which to evacuate it.

Poultices of bread and milk, flaxseed, or powdered slippery

elm bark, kept soft by a proper quantity of sweet oil or lard, make decidedly the best dressings for this affection, until the abscess begins to heal, when it may be treated like abscesses in general.—See *Inflammation, Terminations in Suppuration and Ulceration*.

Should the patient be much debilitated by the discharge of pus, we should sustain her by a nutritious diet, and even allow her a small quantity of good wine in her gruel or soup, till her constitutional powers become somewhat invigorated.

Particular care should be taken, throughout the whole affection, to keep up, if possible, the secretory power of the gland: if this be neglected, the breast is apt to be permanently ruined, so far as regards its usefulness in supplying nourishment to an infant. Suction, gently but perseveringly applied, should either be made by the mouth of some attendant, or by a glass nipple pipe, or other suitable instrument.

It unfortunately happens, that many who have had milk abscess to any extent, continue very liable to a repetition of the disease during subsequent confinements; and when this is not the case, the occurrence of even a slight cold is liable to reproduce a most painful swelling of the affected breast.

The nipple is very apt to become buried in the substance of the breast; or, if the abscess has opened very near it, it is liable to be drawn down in consequence of the contractions caused by cicatrization.

*Of Inflammation of the Nipples.* The nipples are sometimes the seat of excoriations, fissures, and occasionally of such high sensibility, that the mother is utterly incapable of suckling her child.

This state of morbid sensibility may, or may not be attended by a breach in the surface of the nipple. If carefully examined, the extremities of the lactiferous ducts will appear erect, somewhat turgid, and the end of the nipple will seem to be granulated like a raspberry. Slight pressure upon any part of the nipple, will then cause a stinging sensation, which the patient will sometimes declare to you extends not merely into the breast, but up to the arm-pit; yet, when the nipple is protected from pressure by a proper shield, armed with an artificial teat, so that the child can draw freely, she frequently does not experience any pain.

If soreness of the nipples be attended to early, and the general health of the patient be good, it is easily cured, in most cases; and, at first, by simply washing with a little weak brandy, whisky and water, mucilage of gum Arabic, flaxseed, pith of sassafras, slippery elm, or quince seeds: but where it has continued several days, and the parts have become much inflamed, soft poultices with lead water should be applied imme-

diately after the child is removed from the breast, or a weak solution of nitrate of silver, three grains to the ounce of water, may be applied to the fissures by a soft hair pencil, every day, till the surface is found to heal up rapidly. Great care should be taken to wash the nipple thoroughly, before the child takes the breast. Solutions of borax have often been found very useful, particularly when the sore nipples occur simultaneously with the aphthous sore mouth in the child. There are some women, whose breasts are as round as a melon, and the protrusion of the nipple not greater than the blossom-end of that fruit; they have, indeed, apparently no nipple at all. This deficiency is generally charged to the account of tight lacing with corsets. Tight lacing with corsets is an abominable practice, and often productive of much greater evil than depression of the nipples; but we aver, that we have met with this defect in middle-aged, well-grown young ladies, who with singularly good resolution, have never worn corsets during life. With these, therefore, the defect has probably been congenital, and though it causes no inconvenience in the virgin state, produces much mental uneasiness to a mother: let her then set about the regular business of drawing out the centre of the areola on her breasts, by means of the common breast glass, or a smooth edged tobacco-pipe, upon which she may exert suction with her own mouth; or she may use the gum elastic bag, which, if applied in a compressed state, will keep up a constant and gradual draught upon it. In most instances, the nipple can be drawn out so far, that the infant can seize it with its mouth; after which, it can readily be formed into a regular, permanent protuberance.

## CHAPTER IV.

### ON DISEASES OF CHILDREN.

*Tongue-tie.* Children, soon after birth, frequently experience some difficulty in nursing; they either apply the mouth irregularly to the nipple, or take in so much of the breast as to distend the mouth, and a chuckling noise is made by the entrance of air, at its corners: this circumstance is often owing to the child being *tongue-tied*.

The frænum or bridle, which extends from the central line of the tongue to the bottom of the mouth, is either too short, or reaches so nearly to the point of the tongue, that the movements of the latter are very much restrained. Upon examining the mouth, the point of the tongue is found bound down by a thin membrane, which is transparent and without blood vessels. When this band exists, the child is generally unable to apply the tongue around the nipple; for, at almost every attempt, the nipple is forced out of its mouth, until it becomes fretted and fatigued. When this state of things exists, the child should be placed across the lap of the nurse, with a clear light falling upon the part; the membrane should be divided, either by a pair of sharp-edged, but blunt-pointed scissors, a gum lancet, or, what we have mostly preferred, a sharp-pointed bistoury, wrapped to near its point with linen. As a little carelessness may produce troublesome bleeding in this operation, it should not be attempted by any one wholly ignorant of anatomy.

The wound made by a proper incision generally heals without farther attention; but if, by accident, any vessels should be cut, and hemorrhage arise, it must be suppressed by the pressure of a dossil of lint, the application of some wheat or rye flour, a little powdered gum Arabic, or a little piece of alum. In some rare instances the tongue is bound down, and its motions restrained by the extension of the fleshy frænum almost



to its very extremity. An operation in this case would be so hazardous, that nothing can be done with propriety until later in life. Fortunately this condition rarely prevents the child from sucking.

*Swelled Breasts.* Infants are sometimes subject to enlargement of the breasts at the time of birth, or shortly after it. Both mothers and nurses ascribe this condition to accumulations of milk in the child's breasts, and believe that it must be squeezed out to effect a cure! Hence they set about the process of *milking* the poor little creature, who has probably not yet even milked its mother; by which folly the breasts are inflamed, and often seriously injured. A highly respectable medical author reports a case, in which such extensive suppuration followed this kind of treatment, that both breasts of his little patient (*a female*) were entirely destroyed!

These swellings are tense, firm, and elastic; inflamed, and accompanied by an effusion of serum into the cellular membrane beneath the skin. If the inflammation run high, the central portions of the tumours assume a purple appearance. Though the affection is usually mild, it sometimes lasts nearly a week, even under the best treatment; but, unless roughly handled at the beginning, it very seldom terminates in abscess. Cloths, moistened with sweet oil, or a soft bread and milk poultice, changed every three or four hours, are highly useful; and the swelling and inflammation are said to be very rapidly reduced by the application of a warm lotion, composed of one drachm of the muriate of ammonia, (*sal ammoniac*) dissolved in eight ounces of vinegar and water. When suppuration is threatened, a few—say two or four—American leeches should be applied to the parts as a preventive.

*Sore Navel.* This complaint is frequently the result of carelessness in dressing the cord. Besides a deep-red appearance of the abraded surface of the navel, we find there is a spongy or fungous formation, which discharges a thin purulent offensive matter, and the patient suffers much distress and pain. The discharge is sometimes caustic, and inflames every part it happens to touch. The fungous growth generally springs up after the cord has fallen off, but occasionally, also, while it is still adherent.

In treating this affection, every irritating matter should be carefully removed. If any portion of the cord remain attached, it should be cut off close to the navel with sharp scissors, or a scalpel; then washed with milk and water, or flaxseed tea. If a fungous or polypous tumour exist, it should be destroyed by passing a fine silk ligature around its base; after which it may be dressed with the Goulard's ointment, or Turner's cerate. If the fungus be disposed to shoot up

again, the powder of the Indian blood root, (*sanguinaria canadensis*), or a little powdered alum, should be dusted on the part, and the whole surface covered with lint, spread with either of the above named ointments. If the excoriation be extensive, and the discharge copious, washes of lead water, or oak bark tea, are very useful. If this fungous growth be broad at its base, it must be repressed by a solution of lunar caustic, (nitrate of silver,) say ten grains to an ounce of water, applied with a camel's hair pencil, until the parts begin to heal: if this do not succeed in a short time, a drachm of sulphate of copper (blue vitriol) should be dissolved in an ounce of water, and applied once or twice every day by means of a hair pencil or a little lint. Powdered galls, or oak bark, dusted on the part very frequently, will often succeed in causing a healthful cicatrization. If the navel should exhibit an ulcerated appearance, surrounded by swelling, it may be relieved by a bread poultice, well moistened with lead water, and applied as long as there is any inflammation; after which, a solution of the sulphate of copper, of one-sixth the strength before mentioned, will commonly succeed. We repeat, however, that unremitting care should be used to keep the diseased surface constantly clean, and the surrounding parts dry and comfortably dressed.

*Of the Yellow-Skin and Jaundice of Infants.* Most children, when three or four days old, exhibit a yellow state of the skin, for which the officious nurse would promptly administer the saffron or sweet marjoram tea, "very plentifully, with a view to keep out the yellow gum," and thus torture the child with a distended stomach more disturbing than even the disease, which, if left to itself, will usually pass off in a few days. Very young children are, however, occasionally subject to such serious derangements of the functions of the liver, as not only to occasion a deep yellow tint of the skin and the whites of the eyes, but also to impart the same colour to the urinary discharges, while the stools are pale or clay-coloured, from a deficiency of bile.

The proper distinction between the common yellow-skin, which may be said to require no other attention than cleanliness, and the real jaundice, which manifests serious disorder of the internal organs, is this, that the yellow state of the skin in the first affection is unattended by any uneasiness, yellowness of the urine, or costiveness; while, in the latter, the white of the eye is yellow, the patient is restless, fretful, vomits frequently, or exhibits symptoms of nausea, and is little inclined to take the breast; the stools, when they occur, are whitish or clay-coloured, the urine stains the diapers, and very frequently the slightest pressure over the stomach or liver produces pain. This

last is an unfavourable sign. The latter train of symptoms will require prompt and skilful treatment.

If the patient be free from fever and tenderness in the stomach or liver, two or three grains of powdered ipecacuanha should be given every ten or fifteen minutes until vomiting is produced; and if the disease should be obstinate, this must be repeated every two or three days, till the stools assume a bilious or dark green colour. Avoid the use of emetics, if there be any marks of inflammation in the stomach, liver, or bowels. In any case, however, the bowels must be kept freely open, and the best purgative is calomel followed by magnesia or castor oil. We are much in the habit of administering the tenth or twelfth of a grain of calomel with half a grain of the bi-carbonate of soda, and a little powdered gum Arabic, every hour until ten or twelve doses have been taken; then if the bowels be not moved with bilious evacuations, we give a tea-spoonful of castor oil, or about as much magnesia. Our success with this practice has been so uniform in the course of a few days, that we rarely find it necessary to use any other medicine. It is frequently necessary to repeat the calomel and oil every few days, even after convalescence has commenced, for the purpose of keeping up the healthy action of the liver. The warm bath is highly recommended by some practitioners. Gentle frictions over the whole cutaneous surface are useful when there is no internal soreness. When inflammation of the stomach and liver is manifested by great tenderness under the slightest pressure, with fever and vomiting, accompanied by great anxiety and distressful features, four or five American leeches should be applied to the part; or, if they cannot be procured, an ounce or two of blood should be taken from a vein in the arm or leg. If this do not relieve the affection, spread a piece of leather or muslin with a layer of blistering ointment as thick as a wafer; then, with the blunt edge of your spatula or knife, scratch a number of furrows in various directions upon the ointment; fill these fissures with common spirits of camphor, cover it with book or mul-muslin, apply it with a tolerably tight bandage to the skin, over the region of the liver; allow this to remain on about two hours, then remove it, and if the skin appear very red, lay this plaster aside, and dress the part with a soft poultice: repeat this poultice as it becomes cool or dry, and evacuate the blister as soon as it is formed. By this process the patient will experience very little pain from the blister, while the internal disease is very much relieved by it. If a troublesome and debilitating diarrhœa should occur after the disease has existed some days, half a grain of the bi-carbonate of soda, and a quarter of a grain of Dover's powders, should be given, and repeated every three or four hours, until

the irritation of the bowels is allayed, and the diarrhœa arrested. When the jaundice has either been neglected, or has not yielded to the means already directed, two grains of the soda may be given with ten grains of the extract of dandelion, dissolved in a little warm water, two or three times a day. If the little patient should suffer much from flatulence or spasmodic pains, let three or four grains of asafœtida be dissolved in about the same number of table-spoonsful of warm water, and used as an injection into the bowels: if this does not produce relief, give two or three drops of sulphuric ether, in a tea-spoonful of hop tea, keeping up at the same time gentle but brisk frictions on the back and abdomen, if the patient can bear them.

*On Retention and Suppression of Urine.* It is the positive duty of the attendant upon new-born children to inquire into the condition of the bladder; for the urine is liable to accumulate, giving rise to great distention and distress. In general, a delay of fifteen or twenty hours is serious to the patient, whether it depend upon the want of secretion by the kidneys, or retention in the bladder after the kidneys have done their duty. Where we have reason to suppose that the kidneys do not secrete this fluid, they can be frequently excited into action by the administration of a few tea-spoonsful of parsley or wild carrot seed tea containing two or three drops of sweet spirits of nitre, every half hour. The child should be plunged into a warm hip bath, care being taken to have its bowels well evacuated. The external use of vinegar, squills, or a tea-spoonful of juniper oil, with two table-spoonsful of sweet oil, or the juice of onions diluted with water, will promote the object. A drop of spirits of turpentine mixed in milk, or four or five drops of onion juice mixed in the same fluid, may be given two or three times an hour till the secretory process is established. This internal stimulant may be greatly aided by the frequent repetition of injections of warm water.

The urine is occasionally allowed to accumulate and distend the bladder very much; in some cases without the escape of a single drop, at other times with a constant dribbling; so that although the diapers are continually wet, and the nurse inclined to believe that all goes on well, yet the bladder has been known even to burst, and the urine to be poured out into the cavity of the peritoneum. Nothing will afford relief until a catheter of proper size has been introduced by a skilful surgeon.

*Painful Urination.*—There is another serious inconvenience to which children are occasionally subjected: their kidneys may secrete freely, and the bladder contract promptly, but the patient shrinks from the inclination, in consequence of the pain



experienced in the evacuation. The child will have occasional fits of violent shrieking or agitation, as though it had an attack of severe colic pains; upon attentive examination, however, it may, perhaps, be perceived that the uneasiness and pain are coincident with the discharges from the bladder: the urine itself is almost always in an unhealthy condition in these cases: it generally contains too much acid, which irritates the delicate internal surface of the bladder and urethra.

The treatment of this troublesome affection must be regulated by the following circumstances. If the diapers worn by the child should be tinged red by the urine, two or three grains of rhubarb, and double the quantity of magnesia should be given every few hours, till they open the bowels freely, which should then be kept regular by half a grain of calomel and one-eighth of a grain of powdered ipecacuanha, daily, till the digestive functions are restored. If there be eructation from the stomach, or acid odour in the discharges from the bowels, give three or four grains of the carbonate of potash, dissolved in a tea-spoonful of weak infusion of Columbo root, the whole diluted in a little flaxseed tea, or barley or gum Arabic water, and repeat it two or three times a day. If the skin be dry, perspiration should be promoted by the acetate of ammonia, sweet spirits of nitre, and the juice of onions or sirup of squills; but the regulation of these remedies must rest with the physician. If there be a strong disposition to form acid in the stomach and bowels, mild animal soups would be better as diet than any farinaceous articles.

When, on the contrary, painful urination is accompanied by a free deposite of white or yellow sediment, and when the urine itself is pale, instead of red, the treatment must be reversed. The bowels should be emptied by castor oil or rhubarb; and half a grain of powdered valerian root, with one-fourth of a grain of Dover's powder, must be administered two or three times a day, to a child from a week to a year old. Its drinks must consist of lemonade, or water sweetened with lemon sirup, and from one to two drops of the tincture of the muriate of iron, may be given three times a day with considerable advantage. Beef tea or chicken water may be taken, if the child require any thing besides its mother's milk: no alkaline substances should be given, while this condition of urine continues. If the uneasiness be not attended by an unhealthy state of the urine, mucilaginous drinks may, perhaps, remove it.

It is necessary to examine the condition of the urethra in all cases of painful urination, as much protracted suffering has in some cases been kept up, not so much by the morbid condition of the urine, as by inflammation at the extremity of the passage: female children are said to be more especially sub-

ject to this state of things. Solutions of borax in water, or flax-seed tea, should be first applied as a wash to the inflamed surface. The watery solution of opium is sometimes a very soothing application. The parts should at least be kept constantly shielded from the discharges of urine by some lard or mild ointment.

*Incontinence of Urine.*—Some children continue to have involuntary discharges from the bladder, long after they obtain a control over the sphincter muscle of the bowels, to the great inconvenience of the mother or nurse, and to their own extreme mortification if the habit continue as they grow up.

It is said that children are rarely known to pass their urine during sleep, unless they lie upon their backs.

One part of the treatment is sufficiently obvious: and proper precaution in emptying the bladder before lying down, allowing the child to have but a small portion of fluid in the evening, would contribute much to the cure of this disgusting difficulty. The fear of corporeal punishment has sometimes operated favourably, by causing the child to sleep lightly, and to be easily aroused by the slightest impulse to employ the bladder. There is much cruelty in this plan, as in some other remedies advocated by nurses of by-gone days, consisting in obliging the children to eat a disgusting breakfast every morning after wetting the bed. If, however, a really morbid condition of the bladder exist, every effort should be made to invigorate the general health, as well as to strengthen or excite the urinary organs in particular. Cold bathing, free frictions with a piece of flannel, or a flesh brush, should be used; and the child should take from two to five drops of the tincture of muriate of iron, according to the age, two or three times daily. In children over five years old, from one to three drops of the tincture of the Spanish fly, according to the age, may be given two or three times a day, till it arouse the sensibility of the neck of the bladder, and cause a little pain in discharging urine. The free use of a decoction of the bear-berry leaves (*arbutus uva ursi*,) has been found effective in many cases of long standing.

*Excessive Urination, Urinary Consumption, or Diabetes.* Another affection of the urinary organs, to which some children are subject, is an excessive secretion of urine, commonly accompanied by considerable disturbance of the digestive functions, and some morbid changes in the character of the discharge. This complaint generally exhausts the strength of the child with great rapidity. In many instances the urine is quite clear; in some, it has a white deposit, or resembles chalk mixed in water; at other times, it is of a pale straw colour, and has even been noticed of a greenish hue. In some cases this discharge may be coagulated by heat; and it

is remarked that, when this coagulating substance is most abundant, the flesh and strength of the patient decline most rapidly. The little patient suffers from pains in the head, giddiness, and even mental disturbance amounting to temporary delirium; and a stupid, sleepy state sometimes precedes an apoplexy, which concludes the scene. This disease occasionally comes on so gradually, that its daily changes are scarcely noticed; and extensive disorder of the digestive organs takes place before any attention is given to the patient. It has frequently been mistaken for dropsy in the brain, marasmus, or general consumption, even by experienced medical men. When it has advanced considerably, it is very likely to terminate fatally.

We shall not attempt to describe the treatment of this dangerous and obstinate disease. The best medical aid must be obtained as soon as possible; and, in its absence, nothing can be safely done farther than to keep up the action of the bowels and skin, and to rid the stomach of improper accumulations by castor oil, small doses of the Dover's powder, and an emetic, when required, should there be no great tendency of blood to the head. Gentle stimulation of the loins by frictions with spirits of turpentine, and the use of uva ursi tea, are safe, and may prove serviceable.

If the abdomen become tumid, and there be much irritation of the bowels, the patient's diet should be restricted to barley water, rice water, oat meal gruel, or rye mush and milk; but if the digestive powers be still good, and there be no evident affection of the bowels, beef tea, or chicken soup, may be added to the list. If the head appear to be affected, and the gums inflamed, small blisters should be put behind the ears, and kept running some days. The warm bath should be frequently used; placing the infant first in water about the temperature of the skin, and keeping it in the bath for fifteen or twenty minutes, gradually raising the temperature of the water to ninety or ninety-five degrees of Fahrenheit's thermometer. When taken out, the whole surface is to be wiped perfectly dry, and a dress of flannel should be constantly worn next the skin.

*Sore Mouth, Thrush, Aphthæ.* This is a very common disease amongst children, and almost certain to occur when there has been any marked irregularity in diet; the little creatures who have been drenched with nurse's teas, for colic, red gum, &c., being pretty certain to show a plentiful crop of aphthous eruption about the tongue and cheeks a day or two afterward. On the contrary, however, when due attention has been paid to cleanliness, when the child has been sustained on the milk alone, and this fluid is of good quality, the affec-

tion is rarely to be met with, and when it does occur under these circumstances, it is always easily managed. In its mildest form, there is little, if any, manifest disturbance of the general system; there being merely a slight increase of the red colour of the lining membrane of the mouth and tongue, which is covered by white flakes, resembling curdled milk, scattered over the tongue and lips. But in graver cases, the child will show its indisposition by fretfulness, by an increased slavering, and hesitation in sucking. It appears dull and sleepy, but starts frequently from a doze, as if frightened, or in pain. Its breath will be acid, and flatulent eructations will occur sooner or later, with green, watery and griping discharges from the bowels. The child will now vomit up any substance taken into the stomach, and the milk it has swallowed generally returns, very soon afterwards, completely coagulated. The mouth will now be found hot, with its lining membrane deeply reddened beneath a thick layer of white flakes, resembling finely masticated new cheese. Connected with this condition of the mouth, there are usually severe irritation of the bowels, colic, and sour, watery discharges running off almost constantly; the lower orifice of the bowels becomes also inflamed, and sometimes excoriated by these acid evacuations. The child loses flesh very rapidly, becomes very pale, and so sore is its throat that swallowing would be scarcely possible, even were it inclined to take nourishment.

In all forms of this affection, the borax is one of the most useful articles. When the disease is slight and confined to the mouth alone, borax and loaf sugar, in equal quantities, finely powdered, and applied upon the tongue, allowing the child to convey it to every part of its mouth by the natural movements of that organ, will generally cure the eruption very speedily. The bowels should be attended to, and if they be confined, as is frequently the case at the beginning of this disease, a few grains of magnesia should be given, till gentle purging is effected. If there be already a general disturbance of the system, and the bowels frequently moved by acid discharges, the borax should be combined with equal parts of powdered gum Arabic, and applied to the mouth; while small doses of magnesia and rhubarb, with a little valerian, should be given, in the proportion of four grains of magnesia to one grain of powdered valerian root, mixed in half a tea-spoonful of sirup of rhubarb, every three or four hours, till the discharges are corrected. If there be much irritation of the bowels, the little patient should be placed for five or ten minutes in a bath of about eighty degrees of Fahrenheit's scale, then wrapped up warm and dry, and, if not composed, a drop of laudanum should be administered. If there be small thin



discharges, attended by pain or straining, a tea-spoonful of the following mixture should be given every two hours till the child is composed.

Magnesia,	12 grains.
Laudanum,	3 drops.
Water,	1 ounce.
With sugar enough to make it palatable.	

When the discharges are very green and abundant, a drachm of prepared chalk should be used instead of the magnesia, or if the child is pretty strong, the magnesia and chalk may be mixed together with the laudanum and sweetened water, as before directed. Lime water and milk, in equal quantities, may be given the child in tea-spoonful doses, three or four times a day, when there are sour stools without much looseness.

It frequently happens, that if the disease of the mouth continue unchecked for several days, the discharges from the bowels are not only frequent and watery, but streaked with blood. This may be relieved, in most cases, by giving three or four times a day a tea-spoonful of oil of butter, prepared by placing a small quantity of good sweet butter in the bottom of a vessel, pouring over it a pint or more of hot water, and skimming off the oil which then rises to the surface. Thick gum Arabic water, or the thick mucilage of flaxseed, slippery elm, or pith of sassafras, in tea-spoonful doses, administered frequently, will be useful in relieving this condition of the bowels.

While we have before remarked, that we consider the borax the most useful of all local applications in this disease, we mean to confine its application to the white incrustations; but if these become yellow, or brown, we would rely more confidently upon the Armenian bole, rubbed up with an equal quantity of loaf sugar into fine powder—and dusted upon the mouth, in small quantities, every two or three hours. A decoction prepared by boiling half an ounce of Peruvian bark in a pint of water, and given in doses of twenty or thirty drops every hour or two, is advisable, when the mouth is livid or ulcerated.

When the lower extremity of the bowels becomes inflamed by the acrid discharges, the part should be well washed; first, with clean water, milk and water, or flaxseed tea: after which, it should be well anointed with lard, or Goulard's cerate. No diaper should be applied the second time, without being carefully washed.

If the child have not been weaned, it should be confined strictly to the breast for nourishment. The mother's diet, in the mean time, should be so regulated as to ensure the greatest amount of health in herself, and consequent purity of her milk: for this purpose, she should abstain from all spirituous or exciting liquors; she should eat plain animal food with stale bread, rice, &c., drinking water only at dinner. If the child have been previously weaned, its diet must be closely restricted to gum water, lime-water and milk, or chicken-water and beef-tea.

The cruel practice among some nurses of rubbing the child's mouth with a rough cloth, charged with medicaments, should not be tolerated by any parent.

*Colic.* Scarcely a child is born in the temperate zone, even in our day of refinement, but it must have a "little catnip tea to ease the wind," according to the opinion of the *nurses*, who have been slow to abandon the doses of "tiff" which their wise grand-mothers constantly administered, with as much seeming necessity as the good cottager would give pepper corns and a drink of cold water to the young turkeys, "she did not know why, but because her mother used to do it."

To be serious, however, children are, under almost any circumstances, extremely liable to suffer from colic; as may be seen by their becoming suddenly fretful, drawing up their legs, and crying for a few moments, then becoming apparently easy again, for a short time, then going through nearly the same course of symptoms, till there is a discharge of wind from the stomach or bowels. The distress caused by this flatulence is sometimes so great that the child screams vehemently, drawing up its legs, and then stretching them out again, forcibly and suddenly, its face becoming red and bloated, while its abdomen is tightly distended with the flatus which is contained in the bowels. Some children will suffer greatly in this way, with occasional intervals, for some weeks; yet they will thrive, and become quite fat. In these cases, the bowels are rather costive than otherwise, and the colic comes on at some particular hour of the day, like an intermittent fever. This, however, is not the case with many of the subjects of severe colic, as there is very commonly a more or less serious derangement of the digestive organs, attended by grass-green or slimy stools, frequently containing undigested food. The eructations sometimes bring on vomiting of hard clots of sour milk. When this is the case, the child will often be thin and puny.

Colic unquestionably, in many cases, depends upon some ill quality, or excess of quantity of the food taken. When

irritating purges are given to new-born children, weakened digestion and colic are almost sure to ensue. Great distention of the child's stomach,—even with molasses and water, manna tea, as a purgative, or the large doses of other teas which are too frequently given for the rash,—is highly prejudicial. Improper exposure to cold air, with insufficient clothing, is another frequent cause of colic. Gruel, panada, soaked crackers, &c., which are too often given, even to very young children, will commonly occasion colic, with vomiting, green watery stools, and other disturbances. The milk of the mother, from improper diet on her part, may give the child severe colic. Sudden frights, the strong sensation produced by some painful intelligence, or even a painful affection of the nerves of the face of the mother, have been known to cause colic in children, and require, in the two former cases, the removal of the child from the breast, and in the latter, the extraction of carious teeth.

Children often suffer from colic, induced by inattention to the speedy removal of the diapers of the child, after evacuations either from the bowels or bladder.

The mild forms of colic can generally be removed by wrapping the child warmly, briskly rubbing its back and abdomen with a warm dry hand, changing its position, and allowing it to lie with its abdomen upon the nurse's lap, while *gently* agitating its whole body upon the knee. Should it continue to evince pain, a tea-spoonful of warm infusion of fennel seed, or annise seed, may be given at intervals, of five or ten minutes, till five or six doses are taken. Beyond this amount, if the child be very young, no liquid should be given. A table-spoonful of milk of asafœtida, as an injection to a small child, will sometimes be attended with benefit. Opium in almost any of its forms, should be avoided as long as possible—as it is very liable to constipate the bowels, and also operates unfavourably upon the brain. Paregoric, laudanum, and the various carminatives, and “colic tinctures,” are all hazardous remedies. The laudanum, particularly, is often reduced in strength, by the dishonesty of some apothecaries, until children have been nearly or quite destroyed, by using that which is properly made, in doses to which they have become accustomed when employing that prepared by unprincipled but *cheap* dealers.

Two or three drops of sweet spirits of nitre in a tea-spoonful of water, will often relieve obstinate colic; but if all the means pointed out should fail, a trust in Providence will prove safer than that in nostrums or popular remedies where physicians cannot be had.

*Ophthalmia—Sore Eyes.* This is a troublesome affection to

which many young children are subject, from a variety of causes. It generally shows itself from the second to the eighth day, and is first observed, by the adhesion of the eyelids, which are slightly swelled and red. On separating the lids, the eye-ball itself appears red and thickened. In a day or two the swelling of the eye-lids increases, and a thick matter escapes from between them; the child is very fretful and keeps its eyes closely shut. Unless the disease be arrested at this stage, it will increase so rapidly that the membrane covering the eye-ball becomes intensely red and swelled, as if filled with bloody water. The discharge is now so copious, that it will frequently burst out from between the lids and run down in a stream upon the child's cheeks, inflaming the skin wherever it travels. If the disease be not promptly checked in its progress, the eye-lids become everted, the cornea may ulcerate and the humours of the eye run out.

In some cases this disease is confined to the eye-lids alone, the ball not being affected. This case is usually as difficult to cure, though it is much less dangerous to the safety of the eye, than the other.

In the early stage of the red, sticky condition of the eye-lids, we have generally found, that washes of flaxseed tea, carefully strained and poured on the eyes several times a day, answer a good purpose; after which a few drops of rose water have generally completed the cure: but when, from neglect of the first stage, the inflammation has run high, attended by much swelling of the eye-lids and discharge of pus from the eye-ball or lining of the lids, soft poultices of bread and milk, containing a small quantity of lead water, should be applied over the eyes, and renewed as often as they become dry or hot,—the lids should be drawn open occasionally, that the hot fluid may escape, and this should be instantly washed away by a thin mucilage of flaxseed, quince seeds, slippery elm, or, what is better than all, the pith of sassafras. If marked relief be not obtained from this treatment, two or three common sized leeches should be applied to each eye, or to the temples; the blood should be encouraged to flow from the bites after the leeches fall off, by soft cloths dipped in either of the above named mucilages, (made warm,) or by soft bread and milk poultices, which must be changed as often as they become bloody: afterwards the eyes may be washed, or rather wet frequently with a very soft linen rag, saturated with a solution of two grains of sugar of lead in an ounce of rose water. The little patient is to be kept constantly in a dark room; and the eyes protected from compression by bandages: its diet, of course, should be confined to its mother's milk, or to two parts of cow's milk with one of water, and a little sugar: its bowels kept loose by half a grain of calomel, and one grain of cal-



cined magnesia, given every morning and evening in a little milk, or in sirup. These doses must be increased or diminished according to the effect on the bowels. Should not the disease become much lessened in a day or two by this course, the same remedies must be repeated till the violence of the inflammation is moderated; after which the cure can generally be completed, if chronic inflammation continue, by the application of a small blister to each temple, or to the back of the neck, having them kept open for several days by dressing with basilicon, or even weak savin ointment. As soon as the eye-lids can be raised in a very faint light and the discharge has become thin, they may be washed with a solution of a grain of acetate of zinc to an ounce of rose water, four or five times a day. The eye-lids should be kept from adhering to each other by a little mæilage, or a few drops of the mother's milk, or a little fresh butter every evening.

If ulceration of the cornea should unhappily occur, and the humours of the eye be poured out, the patient's system must be supported by bark tea and mild anodynes. One of the most frequent and terrible consequences of this affection is opacity of the cornea, which is rarely curable. That must be a very strong necessity, therefore, which should compel the domestic adviser to tamper with the case; especially, as the more energetic mode of leeching recommended in the article on ophthalmia, in the surgical part of this work, gives to the adroit surgeon an almost absolute command of the disease, but cannot be employed on young children by any other person.

*Costiveness.* The apprehensions of a mother or nurse are very commonly aroused, upon the discovery that the child's bowels are either rather sluggish or very much constipated. While we would not wish to lull them into any false security on this subject, and thus induce them to become indifferent to such a condition of the child's system, they should be aware that children do occasionally remain for several days in a state of perfect health, without any evacuation from the bowels. While, therefore, the child continues to thrive and is cheerful, we would advise them to leave the case to nature;—but, as a general rule, children within the month usually evacuate their bowels from two to six times in twenty-four hours; after that time, once or twice. We should carefully inquire into the state of the intestinal canal upon the occurrence of any indisposition; such as flatulence, fever, stupor, or threatenings of convulsions.

Very simple measures are sometimes sufficient to excite the bowels into healthy action: a small quantity of the West India molasses with water; a little manna tea; sweet oil and molasses, of each, half a tea-spoonful, given every three or four hours,

will often procure free discharges. A tea-spoonful of warm castor oil, given alone, or from one to two tea-spoonsful of fresh-calcedined magnesia, thoroughly mixed with milk, may be given from the age of a month to that of two or three years. Another valuable remedy for habitual constipation in children beyond six months old, is a thin gruel, made by boiling well a small portion of unbolted wheat flour, and straining it through a sieve while hot: this may be sweetened with molasses, manna, or brown sugar, and made an article of diet for the child.

Among the best injections are, one or two ounces of molasses and water, oil and water, or Castile soap and water: among suppositories, a small piece of hard brown soap, cut in proper length and rolled round, a little pointed at one end, dipped into warm water till its surface is slightly dissolved, and then passed into the rectum a quarter of an inch within the anus,—or small pieces of tallow candle, or molasses candy used in the same way. A very common source of constipation in infants, is the abuse of laudanum, either given injudiciously in colic or other diseases, or by nurses in the unprincipled practice of “keeping the child quiet,” by the use of a violent poison.

*Vomiting.*—Children generally possess the power of throwing off from the stomach with great readiness any excess of food which they may have drawn from the breast, or which may have been injudiciously poured into them by the nurse. This is a happy provision of nature, to prevent injury to the extremely delicate digestive organs of an infant, who has not instinctive perceptions with regard to the amount which its little stomach can manage; while it is too common a habit with those who supply the child with food from a spoon, literally “to fill them up to the chin” before they desist. We have not unfrequently been pained to see spoonful after spoonful, poured into the œsophagus of a child stretched out upon its back in the most resistless attitude, till the escape of the fluid at the corners of the mouth, gives the signal for raising it up, and jolting it on the knee till they have “settled it,” and then the same process repeated, till, happily for the child, the stomach vomits it up. Could this satisfy the nurse, perhaps no great harm would be done; but, “lest the poor little thing should starve,” its stomach is again replenished in the same manner, till the nurse becomes wearied with her toil, and allows it a little rest. What better can be expected, than sour vomitings and griping stools, after the organic functions of a child have been so severely persecuted?

The vomiting of children, especially when it takes place soon after free nursing, and the milk comes up unchanged, requires no other attention on the part of the mother than to prevent the child from sucking too much: let her then take the

child away from her breast, as soon as she perceives that it "begins to dally with the organ, or when it ceases to draw as though it were gratifying a necessary and proper appetite." Then keep the child quiet for some time, not jolting or tossing it about, and thus agitating its stomach. But children may have vomiting from causes similar to those which affect adults, and then, careful, prompt treatment, will be necessary. Thus, the suppression of any habitual discharge from the skin, as that from sores behind the ears, perspiration, &c., or a confined state of the bowels, may give rise to this complaint; severe falls, bruises, the accumulation of bile or acid in the stomach, &c., produce sympathetic vomiting. The stomach is commonly relieved simply by removing the cause. If the vomiting should be brought on by the presence of noxious substances in the stomach itself, the effort to throw these off should be encouraged by copious draughts of warm water, weak warm camomile tea, or common tea, till the disturbing cause appears to be removed; after which two tea-spoonful of common salt should be dissolved in four ounces of warm water and thrown up into the bowels; and this injection should be repeated every half hour, till it procures a full discharge. If this do not quiet the stomach, six or eight drops of laudanum may be diluted in a table-spoonful of warm water and salt, and used as an anodyne injection, for a child between six months and one year old; giving it, at the same time, two tea-spoonful of lime water and milk, every hour by the *watch*. When the child appears to be in pain before the attack of vomiting comes on, much advantage may be derived from the use of the "spice bag," in addition to the other means. It is made by mixing together powdered ginger, cinnamon, allspice and cloves, a tea-spoonful of each, putting them into a thin flannel bag about the size of an adult hand, and quilting these powders into the bag by a few stitches, to prevent them from being pressed up into a heap. Lay this bag on a plate or saucer, and pour over it a quantity of warm brandy or spirits, sufficient to saturate it, then apply it upon the skin over the stomach: when it becomes cold or dry, let it be saturated again and again. A most essential advantage is usually derived from this application.

If vomiting be caused by the superabundance of acid generated in the stomach, the milk is thrown up in a completely curdled state. If the curd be very hard, it is because the acid is very abundant. A looseness of the bowels generally attends on this state, if the child be teething; but at other times it is costive. If loose,—the lime water and milk, as before directed, two grains of bi-carbonate of soda with a little powdered gum Arabic, or a tea-spoonful of the common chalk mixture may

be given every two or three hours; and, if necessary, half a drop of laudanum may be combined with each dose of either of these prescriptions, until the irritation of the stomach and bowels is quieted. On the contrary, if the bowels be constipated, a tea-spoonful of fresh calcined magnesia should be mixed with ten tea-spoonfuls of milk or water, sweetened with a little sugar, and a tea-spoonful of the mixture given every hour, till it operates. If the torpor of the bowels be very great, the saline injection mentioned already should be given to aid the purgative action of the magnesia: lime water and milk may be taken in tea-spoonful doses very frequently, if there be much thirst. If the child appear to be feeble, and without fever, ten grains of the bi-carbonate of soda may be dissolved in an ounce of weak Columbo tea, and a tea-spoonful given every hour.

When the child, after having been nursed at the breast, appears to be pale and distressed for some time, and then, in a moment, vomits up the milk unchanged and with great force, there is reason to suspect a deficiency of the acid necessary to effect the change which is preparatory to complete digestion. Under these circumstances it is necessary to supply the deficiency artificially, by giving the child a small quantity of lemonade, occasionally, which must be discontinued, as soon the milk is found coagulated upon being vomited. If the child have been weaned when attacked with vomiting, its diet should be carefully attended to, and it will frequently be found necessary to allow it chicken water, with its common farinaceous food.

*Erysipelas.* Some children become the unfortunate subjects of erysipelas soon after birth. A few instances are recorded, in which they were born with patches of this kind of inflammation, which had advanced so far as to present vesications, and even gangrenous spots. When it does attack children, it is generally shortly after birth, say from the first week to the third month, and commonly commences in the form of a red blotch, on the lower parts of the body, groins, hips, navel, or inside of the thigh. It is painful from the beginning, and is swelled, dark red, or purple, with an irregular surface. Within the first twenty-four hours, small blisters may often be seen scattered thinly over this inflamed part, though some cases run through their whole course, without a single blister being formed. Rapid vesication coming on shortly after the commencement of the disease, is a very unfavourable symptom, as there is then a strong disposition to mortification: this is more particularly the case when the disease happens to affect the abdomen. When it is seated on the limbs, or about the hips, it is more likely to occasion ulcerations from destruction of the cellular substance beneath the skin. This disease and its consequences have been described in the second chapter of the



second part of this work. The course of the complaint is much more rapid in infancy.

In some cases, the affection is easily managed, giving way in two or three days without any unpleasant consequences. It is always, however, to be watched with solicitude, as some cases which appear mild and local at first, spread very rapidly over various parts of the body. We have seen it attack one arm, and thence traverse the whole body regularly: even when we hoped that it was completely subdued, we had the mortification to see it re-commence, and travel over precisely the same surface, till it destroyed the child in the course of ten days. Sometimes, however, it leaves one place suddenly, and attacks another remotely situated from it. Some children have attacks of erysipelas, whenever they happen to receive the slightest wound.

Children in all situations, are occasionally subject to this disease; but those who are nursed in ill-ventilated apartments are especially so. We cannot regard the treatment of this affection as a suitable subject for popular directions.

*Dentition*, or the process of growth of the primary teeth, does not often, in itself, involve any hazard to the child; but it is universally remarked, that, at this period, the system is by far more excitable, and that ordinary disorders make much more impression on the health than at any other. The mechanical obstruction which the firm membrane covering the gums gives to the ready passage of the tooth in some children, does occasionally involve the little patient in great local pain, as well as severe sympathetic irritation, causing fever, headach, sometimes inflammation of the brain resulting in dropsy, or producing disturbances of the nervous system, from a slight start in the sleep, to the most terrific convulsions, which may terminate in sudden death.

In mild cases, when the child has been well nursed, almost the only affection attending the process of teething is some slight rash, or eruption. None of these eruptions are dangerous to the child's health, if not interfered with, and the officious meddler will often pay dearly for his temerity, in attempting to dry up an eruption on the skin behind the ears, the top of the head, or any portion of the external surface. We have seen, diarrhoea, bloody stools, fever, convulsions, and dropsy of the brain terminating in death, where the mother, contrary to our counsel, anxious to remove an unsightly eruption on her child's head, anointed the sores well with the *red ointment*, which a female friend had assured her could not hurt the child. This, we believe, to be the history of hundreds of fatal cases of dentition; and our experience on this subject, is sufficient to warrant us in giving instructions positively, and in a few words.

Keep your child clean by proper and frequent ablutions,

and changes of dress, especially next the skin. It is folly to neglect its flannel, muslin, or linen shirt and under dress for a week or longer, while its over dresses are changed almost hourly, upon the arrival of every new visiter! Daily changes in the under dress, are far more important to the health of the child. Keep it upon such diet as has been found to agree with it, and almost uniformly this is the mother's milk, if she have it in sufficient abundance. Wait until the process of dentition is complete, before you tax the child's stomach with digesting solid or crude food. When the child slavers fully, and you perceive it strongly disposed to bite hard substances, procure an ivory, or what is better still, a gum elastic ring, one-fourth of an inch thick, and two inches in diameter, so that the child cannot swallow it. Let it press its gums at pleasure upon this, and generally you will soon find the teeth protruding. If the child be feverish, without apparent reason, and if the gum be swelled, even if there should be no very certain sign of the approach of a tooth, you will be justifiable in cutting the gum. For this purpose lay the child horizontally with its head upon your knee, having the hands held by an assistant: depress the lower jaw firmly, apply the sharp edge of your tooth lancet, or a pen knife with the edge chiefly covered by winding cotton or silk around it, upon the gum over the seat of the tooth; then, carefully removing the lips and tongue by interposing the fingers, cut freely down upon the tooth. This operation will give little or no real pain to the child. When the tooth lies very deep, we need not attempt to reach it. Should there be much bleeding, the pointed end of a piece of alum passed over the wound, will generally arrest it. Let the condition of the bowels be carefully watched. A gentle diarrhœa is often established by nature, when there is no sympathetic cutaneous disease. This must not be stopped, but only regulated. If it appear to be prostrating the powers of the child by thin watery, copious, and frequent evacuations, it will require prompt and skilful medical care. The diet should be the mother's milk exclusively, or thick gum Arabic water, rice water, barley water, &c. When the cutaneous eruption becomes troublesome, it is to be *relieved* by washes of tepid flaxseed, slippery elm, or pith of sassafras tea, and the bowels regulated by the magnesia, or castor oil, when costive. Children, as well as adults, often find much relief to the itching and burning in the skin, by dusting upon its dry surface a little powdered starch, arrow-root, rye meal, or flour. This should never be done when the skin is broken, and a discharge issuing from it. Let the child's mouth be washed every morning, or more frequently, with cold water; and if it have no fever, let it be carried out into the open air every day, in suitable wea-

ther. The child's head should be kept cool by day and by night, and it should dispense with wearing caps, and sleeping on soft pillows.

If convulsions occur during dentition, the gums should be promptly and freely lanced over the spot at which a tooth presents itself. This is most likely to happen, when the molar, eye, or stomach teeth are about to come through. It is especially necessary, at this period, to watch the child carefully, and to avoid all irritating articles of food. The bowels should be kept open by calomel, castor oil, or magnesia. Three or four grains of the former, followed in an hour by a dessert-spoonful of oil, or a tea-spoonful of magnesia, mixed in a little milk or sweetened water, will be likely to purge freely. Immersion of the whole body, for fifteen or twenty minutes, in a bath heated to ninety degrees,—if practicable, will be very serviceable in the spasm.

The foot bath of the same temperature will act as a partial substitute. Poultices of onions, well stewed in vinegar and water, with the addition of a little flour of mustard or Cayenne pepper, or even soft bread with the mustard or pepper, applied to the ankles or soles of the feet until the skin becomes red, will be useful on this occasion. When the bowels have been freely opened, a table-spoonful of strong asafœtida tea should be injected into the bowels, if the spasms be not already relieved. Should the case prove obstinate, and not manifestly relieved by the treatment already proposed, or if the child's face appear flushed, two or three American leeches should be applied to each temple, and the blood encouraged to flow till there is a little paleness. Next, if necessary, should be a pair of small blisters applied by narrow bands of adhesive plaster to the bare space behind the ears, or a blister may be put on the back of the neck. Cool drinks, and light nourishment, as rice, barley, or arrow root water, should be given occasionally. Cold cloths, or a bladder one-third filled with cold water, with all the air excluded, that it may fit like a cap to the head, should be kept applied during the continuance of the disturbance of the brain, removing it for a short time every five or ten minutes, that it may not endanger the freezing of the scalp. It sometimes occurs, that the gums at about the period of dentition become ulcerated. If the tooth has not come through this spot, it is proper to cut down upon it, and then touch the ulcer with a solution of six grains of the sulphate of copper, in an ounce of water, applying it upon the ulcer by means of a camel's hair pencil, or a dossil of lint saturated with the solution, and taking great care that the child does not swallow any portion of it. It may be washed off in a few moments with clean water, and the application repeated twice a day.

*Worms.*—We have treated of worms in a preceding chapter, and we introduce the subject here, merely to protest against a popular opinion amongst *nurses* and some mothers, that those children whose health is not in every respect perfect, are afflicted with worms, and consequently, that the poor child who rubs its nose, or has any irregularity in its appetite, is to be well dosed with worm lozenges, worm tea, Swaim's vermifuge, or some other of those *celebrated nostrums* which may be known to the superintendent of the child's welfare. As many causes operate in producing the above symptoms, and as they very often yield readily to other medicines skilfully administered, while the reputed *worm medicines* are often given without any manifest discharge of these vermin, we feel safe in declaring that there is no positive proof of their existence, until they have been seen expelled from the bodies of children. For the treatment then proper, we refer to the article worms, in the second chapter.

*On Convulsions.*—Many children, even when very young, are subject to sudden and rapid muscular movements; they will start in the nurse's lap, as though suddenly surprised with danger of falling; their eyes will sometimes exhibit a quickness of movement or a squinting direction, which is calculated to excite much apprehension in the minds of those about them. As the children increase in age and size, however, this mobility generally becomes tranquillized; but if they be fed with unsuitable food, such as pap, boiled crackers, &c., whilst very young, or be indulged in solid food, or crude fruit, when a little older, convulsions and death may follow.

An attack of these "fits" is very frequently preceded by dulness, stupor, or restlessness, and slightly irregular movements of some part of the child; as the clenching of a hand, and unnatural motion or fixedness of the eye; some distortion of the lips; a forcible gnashing of the gums against the nipple, while sucking, and a rigid closure of the mouth, so that it can scarcely be opened by force; then, a suspension of all action for a few moments, except, perhaps, a quick motion of the eyes and muscles of the mouth. Presently the child becomes very restless, again all the former symptoms present themselves, till the whole body is completely convulsed, the mouth foams, and the little creature soon sinks again into a state of tranquillity, from an exhaustion of its physical powers.

The treatment of these cases must be left to the profession, unless under very peculiar circumstances, and in such situations as that of the missionary in a savage country, the pioneer in the wilderness, and the captain of a transport or convict-ship at sea without a surgeon. We can offer no better advice than to follow the general directions given under the head of



*convulsions* in a preceding chapter, (p. 481) with an appropriate diminution of doses.

*Dropsy in the Brain* is a disease which very often comes on gradually, and almost imperceptibly; commonly beginning in the same manner as convulsions. The child is wakeful; or, if it sleeps, it grinds its teeth, and often starts or rouses up suddenly, alarmed and screaming. Its bowels become irregular, and the discharges have an unnatural appearance: they are often green, slimy, or watery, and streaked with green and pale coloured matters. The countenance is usually pale, and anxious or disturbed. Sometimes there is a red spot or flush upon one or the other cheek; the eye-brows are knit into a peculiarly unpleasant frown; the eye-lids are half shut whenever the child is exposed to the light.

Children, who can speak, complain of pain in the forehead; and even small infants indicate suffering in that place, by a constant disposition to apply the hand upon the head. As the disease progresses, vomiting occurs, and becomes very frequent, especially when the child is set upright. It is very restless, and tosses its head from side to side, evincing much suffering by its groans or whining expressions. Its skin is dry, and generally rather hot; the pulse is frequent and hard, but not full; the tongue is seldom coated, but, when so, its edges are pale, and the fur is in the middle: when, however, the bowels are much disordered, it is covered with a thick brown coat, which, after a time, becomes dry and rough. Soon after this, the child appears dull and stupid, regardless of surrounding circumstances, and inclined to sleep constantly. There is not only a general inactivity, but also a palsy of one or more extremities, by which it is rendered motionless, except a slight twitching of the toes or fingers: one or both eyes may now be observed to squint; and either remain fixed, or be in constant motion. The lids themselves become palsied; the upper one falls over the eye, and partially closes it, while the lower one declines towards the cheek, and remains constantly open, giving a most ghastly look to the whole countenance. The pupil of the eye may be found either unnaturally contracted or dilated: convulsions soon follow, and, after a lingering indisposition, close the scene; the body having, in some instances, been reduced to a state of complete emaciation.

Except in the very early stage of this disease, we believe little can be done for its cure, or even essential mitigation. The affection often creeps on so insidiously, that it escapes the observation of even the anxious mother. Sometimes the first thing known is the convulsion.

The fever should be kept down by such means as invite the

blood away from the brain; and for this purpose the bowels should be purged by a few (from two to five, or six,) grains of calomel, followed by rhubarb, magnesia, Epsom salts, or castor oil: these must be repeated every day or two, until the discharges are more natural. During all this time the most simple diet only can be allowed the patient, such as boiled milk, barley water, arrow-root, rice water, &c. Should the patient be cutting teeth, the gums must be examined and, if swoln, lanced. If any sore behind the ear have been recently dried up, it must be again opened by a blister. A free bleeding from the arm will be necessary; and afterwards, leeches to the temples and back of the head, or cups to that part and the back of the neck.

We once saw a most happy change effected in a child about three years old, who was just passing into the sleeping state with this disease of the brain, by having its head shaved and covered over with leeches, allowing them to draw until the child became faint; they were then stripped off, and the child was carried out into the air. In less than twenty-four hours, it began to recover, and in a short time was entirely well. Our experience is, therefore, rather more in favour of free bleeding with leeches than bleeding from the arm alone; but in whichever way it may be done,—to be of any service, it must be done freely. Keep the extremities warm, the bowels open, the head cold, the room dark and quiet, and avoid exhibiting any thing which would call for the action of the brain whilst its delicate coverings are so much inflamed. After bleeding and purging, the Dover's powders are thought to be useful in quieting the patient, and disposing to perspiration. We think, they should be given with caution; and the head, at the same time, should be covered with a cap wrung out in cold water, and its temperature constantly kept under. A blister behind the neck might be useful after the system has been sufficiently reduced by bleeding and purgatives.

*Of Whooping-Cough.* This is an affection to which children are subject at some period of their existence; and one, also, which is not confined to infancy or childhood, though by far most common in these stages of life. It usually begins as an ordinary cold, or catarrh, at first without fever, and after continuing some days, during which it gradually increases in severity; a peculiar *whooping* sound is caused by the passage of the air through the spasmodically contracted windpipe in inspiration. The child's face becomes flushed and almost purple from the exertion in coughing, till the stomach rejects its contents, which are thrown up in conjunction with more or less of a ropy mucus that is secreted by the glands of the throat and mouth. The paroxysm then usually abates, and

the child, after a few moments, resumes its amusements, and remains tranquil till a repetition of the fit. The coughing sometimes lasts for several minutes, during which the child will be nearly exhausted, and the vessels of the head and chest become so turgid with blood, that a hemorrhage from the lungs, nose, or ears, may take place. It is not unusual for infants to be seen reluctantly leaving the nipple to cough till they vomit the milk they have just drawn, and as soon as they recover from the fatigue, again return to the breast. When the child is reduced, it is not unusual for discharges to occur involuntarily from the bowels and bladder at the same time. Fever usually attends this cough, in some part of its course. Occasionally it begins with the cough; but frequently it is not perceived for the first week or two, and in some cases the disease is so light as to excite very little fever. The cough commonly increases in violence for five or six weeks; when, under favourable circumstances, it gradually declines, and finally disappears. Should it commence in autumn, and the child be exposed to the vicissitudes of winter, it is generally aggravated, and seldom passes over without some evidence of its destructive power. If the child survive, it will remain extremely liable to a constant harassing cough, which often results in abscess of the lungs, dropsy of the chest, or rapid consumption. General dropsy sometimes occurs in consequence of severe whooping-cough. The affection is contagious. It is to be managed by a proper attention to clothing, always keeping the body, breast, and extremities warm, regulating the diet to prevent fever, keeping the bowels open by castor oil, rhubarb, senna tea, or Epsom salts, giving some expectorant medicine to keep the throat moist, and endeavouring to allay the spasmodic action of the windpipe. For this last purpose, from three to thirty drops of antimonial wine, or the same quantity of the compound sirup of squills may be given in from half a teaspoonful to a dessert spoonful of milk of asafetida every half hour or hour, according to the age of the child, or the severity of the symptoms. Should the child be of very full habit, and have fever, or hemorrhage from the lungs, nose, or ears, it will be proper to abstract some blood from the arm, by the lancet; or from the temples or back of the neck, by cups or leeches. From one ounce to three or four ounces may be taken according to circumstances. After this, a plaster of Burgundy pitch should be placed on the back, from the lower part of the neck to the lower part of the chest, and allowed to remain as long as it can be borne. If removed before the patient has recovered, it should be replaced by a piece of flannel. The front part of the chest may be rubbed from time to time with opodeldoc, or the volatile liniment, whenever there

appears to be much difficulty in the respiration. Probably the common custom of rubbing the breast freely with warm *goose grease* is frequently useful. When the child is much reduced by the effort of coughing, and often vomits the food it takes, its diet should be as nutritious as practicable. Plain animal soups may be given in small quantities at a time, if its teeth be not yet cut; and if able to masticate, it must be allowed to eat a little well cooked meat, to sustain its enfeebled system. Its bowels will require strict attention. Costiveness must be corrected by laxative medicines, or injections which contain asa-fœtida. Great care is to be taken of the child during the period of its convalescence, to prevent its exposure to cold and damp, as it is extremely susceptible of catarrhal affections, which may either run their course rapidly, in a debilitated constitution, or result in a chronic cough, or, ultimately in consumption of the lungs.

*Mumps.* This is another affection which is sometimes propagated by contagion, though it often springs up spontaneously, and is not very easily communicated to others. It generally begins with a slight fever, with some stiffness of the jaws, and a little swelling of the glands under the ear, on one or both sides. At first, the enlarged gland can generally be moved about under the skin; but after the fourth day, it becomes firm and tender to the touch. The glands under the mouth often become as much swelled as those under the ear; and the skin, which commonly retains its natural colour, is sometimes slightly reddened. The patient soon experiences great difficulty and pain on masticating and swallowing, and is troubled with restlessness, and nervous irritability, though there is seldom much fever. The swelling usually abates in less than a week from the commencement, and with it, all the feverish symptoms generally disappear. Suppuration of the gland is uncommon, but so strong is the sympathy between these glands and the testicles of the male or the mammæ of the female, that these sometimes become very much swelled, causing great pain in the parts, and fever. The brain is sometimes the seat of this translated action, and then delirium, stupor, and even death may follow.

When the case is mild, little more attention is necessary than to keep the child warm, and give it some mild laxative, and warm drinks, with a few drops of the sweet spirits of nitre, to favour a gentle perspiration. If the swelling suddenly leave the throat and attack the breast or testicles, the parts which were originally affected should be covered with a mustard poultice, rubbed with strong volatile liniment, or have a fly-blister applied over them, to excite a return of the inflammation and swelling. In more severe cases the skin should



be kept in a state of perspiration, by nauseating doses of antimonial wine and sweet spirits of nitre. To lessen the swelling, which is liable to remain after the pain and fever have abated, the tumours should be frequently rubbed with the soap liniment or opodeldoc.

*Inflammation of the Tonsils—Quinsy.* The glands which project into the upper part of the throat, and back part of the mouth, are, in some children, as well as in adults, particularly liable to inflammation; and, unfortunately, those who have once experienced an attack, are very liable to repetitions of it during life. In young children who cannot speak, it is difficult to recognise the commencing symptoms of the attack, and the attention of the mother or nurse is seldom drawn to the infant until it is found unable to swallow. Those who can speak, commonly complain of some chilliness, with pain or uneasiness at the back part of the mouth. Shortly afterwards swallowing becomes very difficult, and upon examination of the parts, the tongue is found covered with a white fur, through which the red parts of the papillæ project, and the whole back part of the mouth has a red or livid hue, while the tonsils are seen swelled and prominent.

The large vessels of the neck and throat throb violently; there is much headach, fever, and difficulty of breathing and speech; the latter, being shortly reduced to a laborious whisper. It becomes almost impossible to drink liquids, although the patient can generally swallow soft food, such as thick gruel, thin mush and similar preparations.

This swelling commonly increases until matter is formed, and after some hours of great pain and horrid sense of suffocation, it bursts and discharges matter, to the inexpressible relief of the patient.

The swelled glands, however, are sometimes covered with an ash or gray-coloured spot of matter, which has been separated from the subjacent inflamed parts; and suppuration rarely accompanies this condition of the glands, though the patient is not in a less dangerous state on this account.

The abscess almost always opens into the mouth, though it sometimes points on the outside, and then leaves an unpleasant-looking scar in healing.

This disease is apt to run its course very rapidly, and consequently requires the most energetic treatment, if we expect to prevent suppuration. From repeated attacks of the disease, the gland is apt to become so large as to prove a source of difficulty in swallowing and speaking; especially after a slight cold has been contracted.

If there be fever with a pretty full pulse, the patient should be freely bled till the pulse is reduced, and a brisk purgative

should be given, composed of Epsom salts, senna tea, or castor oil. After this the feet should be immersed in warm water, and the patient should take every hour from three to twenty drops of antimonial wine, and from five to thirty drops of sweet spirits of nitre, according to the age, so as to keep up a little sickness at the stomach without absolute vomiting. A few American leeches, (from two to twenty,) should be put upon the sides of the throat, or some cups applied to the back of the neck. When this has been done without effectual relief, a blister should be placed on the throat or back of the neck, or if the case be mild, bathing with equal parts of spirits of turpentine and sweet oil, or two parts of hartshorn water and one of sweet oil will be necessary. The common remedy of scraped potatoes, saturated with hot vinegar, has often done good in mild cases—so does the inhalation of the steam from hot water, or vinegar and water, when it becomes desirable to hasten suppuration. We are decidedly opposed to the use of any kind of gargle in the early part of this disease. The throat should be kept as quiet as possible, till suppuration has taken place, when it may be carefully washed with flaxseed and wheat bran tea, with a little vinegar or lemon juice. Towards the last, however, the gargle may be somewhat astringent and composed of oak bark or nut gall tea.

*The Cholera Infantum, or Summer Complaint.* This disease is almost peculiar to children of large cities, and is most frequent in those who reside in small, crowded, and ill-ventilated apartments. It is rarely seen, except between the ages of three and twenty-four months, seldom beginning before or after dentition. It usually begins with vomiting and purging about the same time, though, in some instances, purging may take place a day or two before the stomach is materially disturbed. The tongue, in most instances, is slightly furred at the beginning of the disease; but, after a few days, it becomes smooth and polished, or dry and brown. The stools are commonly thick, frothy, and fluid, intermixed with little spots of green bile, though, at other times, they are as transparent as water, having only some flakes of mucus floating through them. After a short time, no bilious matter is to be seen in the discharges. The patient usually becomes immediately prostrate; and, if not speedily destroyed, it emaciates very rapidly. The vomiting and purging are not always constant, but sometimes occur in paroxysms, after intervals of a few hours; and, in some fortunate cases, after a duration of five or six hours, they subside entirely. There is evident pain, or great uneasiness in the stomach and bowels, especially in the commencement. The hands and feet are cold, the skin of the body and head is hot and dry, and becomes shrivelled or

wilted. The eyes lose their lustre, the eye-lids but half cover them, the nose becomes pointed, and the skin contracted upon it, while the lips are thin and shrivelled. In this condition the child lies upon the lap, or upon the pillow, apparently exhausted and indisposed to move, except when impelled to vomit, or cry for cold water; the only thing which it is willing to take; and this is often either thrown up instantly from the stomach, or suddenly passed off by the bowels. From this state it frequently sinks into stupor and insensibility, and often dies in convulsions. If the disease do not thus speedily destroy life, the stools assume a dark, offensive, and highly irritating character; the mouth becomes sore, covered over with white fur or superficial ulcers,—the face bloated, the abdomen distended with flatulence, and when the system is very greatly reduced, the skin is sometimes studded with spots of blood effused beneath the cuticle, or there may be some watery blisters, scattered about the chest and other parts.

The treatment of this very fatal disease is so complex and difficult, that it cannot be explained to a popular reader, or intrusted to such, with safety, *under any circumstances whatever*. Fortunately, it is rare, except in large cities, where medical advice is at hand, and yields, or becomes mild, almost immediately on a removal to a cool country situation. The wealthy should take the general advice of their family physician, and then fly with the child to the open air of a farm or small village. The poor should depend on their doctor; and we have but one hint to give them. A well ventilated apartment in the upper story of a house, if not too much heated by the roof, will give their children a much better chance of life, with or without treatment, than the ground floor. Let the child remain day and night in such a room.

We have frequently seen the disease in the country, and found it very fatal; but only in residences where uncleanly habits, and the miserable construction of residences which we have censured in the chapter on Hygiene, have produced an artificial hot climate and the foul air proper to an alley, in the midst of the free atmosphere of healthful districts!

For the prevention of this disease, we would earnestly press upon those mothers who reside in large or compact towns, and in the lanes and alleys where the affection most prevails; to keep their houses clean and well aired; to wash the whole bodies of their children, daily, or more frequently, with clean, tepid, or cool water, changing their dress sufficiently often to keep them cleanly clad: to abstain from the use of unripe or unwholesome fruit themselves, and by all means, to prevent their children from eating it. Let their infants be sup-

plied, as far as possible, from their own breasts, and if they do not supply sufficient nourishment, let the balance be made up with pure cow's milk, either alone or moderately diluted with soft water. When any teeth make their appearance, or the gums appear swelled, and the child is fretful, let the gums be carefully and freely lanced; and if there be any eruption on the skin, or behind the ears, let no applications be made to them, except for the simple purpose of keeping them clean, without suddenly drying them up. If they should heal rather suddenly, and the child become restless or feverish, let a little blister ointment be rubbed behind the ears, till a discharge is produced, carefully keeping the blisters open, by dressing them with a little basilicon or savin ointment. Let the child wear flannel next its skin, and worsted stockings on its feet, even during the summer season; and when it has passed beyond its first year, let the diet be regulated strictly on the principles laid down under the head of *weaning*.



## CHAPTER V.

### ON DISEASES OF ADULT FEMALES.

*Appearance of the Menses.*—In the early years of life, there is no very material difference in the condition of the two sexes, except what results from the difference of education; but, in temperate climates, the system of a girl, aged from thirteen to sixteen years, suddenly sets about a very important and well known change. The child leaves off the amusements which she enjoyed in common with boys, becomes diffident and retiring in her manners, and prefers associating with those of her own sex. She may now feel a remarkable fulness and tightness about the head, with an occasional dart of pain through her temples, while, at the same time, there is a sensation of weight about the lower part of the abdomen and thighs, with lassitude, and pain in the back. If now a few drops of red coloured fluid escape from the vagina, she obtains immediate relief and soon forgets her sufferings until, after the lapse of some weeks, the same sensations return, perhaps with less violence. After a few such periods she becomes, as her friends would say, “right.” Sometimes the secretion commences at a later age; and, frequently, some months elapse after its first appearance, before there are any symptoms of its recurrence. So long as these circumstances are found to be consistent with continued health, the alarm usually felt by the friends is altogether unfounded, and all interference with the course of nature is worse than foolish. More generally, however, before the delay has continued for many months, the health of the young girl begins to suffer severely, and she is found to labour under chlorosis.

*Chlorosis or Green Sickness.* If the secretion alluded to in our introductory remarks do not take place at the proper period, the girl is apt to have a pale, wax-coloured, bloated face, bad digestion, and palpitation of the heart under the slightest bodily or mental exertion. She becomes languid, feeble, and often excessively nervous, or so dull and listless that

she can scarcely be roused to common activity. Her ankles will swell towards evening; her sleep may be disturbed; and her appetite may become so greatly depraved that she will desire the strangest articles for food; such as dirt, charcoal, putrid meats, &c. Her bowels are usually costive; and the stools, when they occur, are often clay-coloured, for want of sufficient bile. Though usually costive, she may at times have some griping pains in the bowels.

In case medical advice cannot be obtained, we believe that the following directions may be observed, with some prospect of advantage, by an intelligent friend. When there exist no obvious objections to this course, growing out of the peculiar situation of the patient, we may commence with the administration of an emetic of twenty-five or thirty grains of powdered ipecacuanha, in a little molasses or sirup. This should be followed up by five grains of calomel, ten of rhubarb, and five of aloes, as a purgative. The bowels should be afterwards kept in regular action, by one grain of calomel and five of aloes, given every second or third night till the tongue is clean, and the evacuations become natural or bilious. After this, the calomel should be omitted, and a grain of the aloes combined with four grains of the carbonate of iron, given in the form of pills, three times a day. Light nourishing diet and exercise in the open air should be recommended in all cases. The patient should use the warm, salt foot-bath, and the flesh brush, every night and morning; sleeping on a mattress, or hard bed. If subject to acidity of stomach, let her take chamomile tea, and the bi-carbonate of soda: a tea-spoonful of the latter in a pint of the former, will be an allowance for twenty-four hours. Bleeding is generally improper in any stage of this affection. If the head become hot and painful, the feet should be immersed in a warm bath, made gradually hotter by the addition of hot water: a bladder of cold water, or ice may be kept to the head while the symptoms continue, and a little blood may be drawn from the inside of the thighs by leeches. The usual mode of administering hot infusion of pennyroyal, rue, &c., is not only useless, but often prejudicial, because we are unable to ascertain the exact moment when the discharge should appear. The delay or arrest of the usual evacuation often results from other diseases, such as chronic liver complaint, or protracted intermittent fever, and it is worse than folly to endeavour to force it forward before the disease is cured, when it will generally reappear spontaneously.

The various nostrums for female diseases, which are recommended with so much assurance by the manufacturer or vender, are dangerous, and should never be employed. Though some of them may have been used originally, with much success, by

eminent physicians whose names they sometimes bear, they have been essentially modified by passing through the hands of a succession of druggists, each of whom combines the ingredients in different proportions, or substitutes one for another, till they resemble an old ship which still passes under the same name, though she has been so often repaired that not a single original timber remains.

*Suppression of the Menses.*—The woman may have “been right,” or “regular,” for a longer or shorter period, yet owing to some such cause as getting her feet wet, or being in other respects out of health, the discharge may not recur, though she may have the premonitory symptoms in greater degree than usual. There may be headach, pain in the bones, and especially in the back, with fulness, bearing down, and a distressing irritation of the bowels, but no discharge from the uterus. Now the conditions of the system under which this occurs, are various. The patient may be either in a state of vascular excitement, or she may have spasm of the uterus. If she have fever, headach, a rapid and full pulse, a hot skin, thirst, and tenderness over the uterus, her case is to be treated by bleeding from the arm till she becomes pale, free purgations by salts, confinement to bed, low diet, and leeches to the vulva, or cups to the inner side of the thighs. When the inflammatory action is reduced by these means, the discharge will probably return and continue, unless interrupted by some new cause.

If the patient be thin and delicate, and of a nervous constitution, the same causes which excited inflammation under the circumstances just described, may occasion the spasmodic contraction of the uterine vessels, and thus give rise to suppression of the menses. The patient, instead of being feverish, will then be chilly, with cold extremities; and although she will suffer some pain, there will not be any particular tenderness on pressure over the region of the uterus. In this condition, the patient should be treated by means of the warm hip bath; warm drink; such as barley water, rice water, infusion of catnip, or very weak pennyroyal tea; and the Dover's powder, with camphor, of each five grains every three or four hours, till the pain abates. Two drachms of asafoetida, dissolved in six ounces of hot water, and used warm as an injection, often acts with great promptitude. If it do not give relief in a short time, half the quantity may be repeated, with the addition of fifty drops of laudanum. If now no menstrual action take place, we consider the case as one of obstructed menstruation.

*Obstructed Menstruation.*—By this term we mean a suppression of some standing. In this form of the complaint, there

are generally some symptoms which resemble those of chlorosis. The appetite fails, or becomes deranged; the patient is often afflicted with headach, dropsical swellings, and many other disturbances, which sometimes involve the mind itself, causing even incurable insanity. In some women the digestion alone is affected. If we know that conception and pregnancy are not the cause of the suppression, the remedies recommended under the head of chlorosis, will be proper; but it may be added, that the patient who has once menstruated freely, is generally capable of bearing the loss of more blood, than the chlorotic female. An excellent preparation for the purpose of keeping up the regular action of the bowels, and exciting a disposition to menstruation, is the following combination.

Take,	Powdered rhubarb,	1 drachm.
	Powdered aloes,	$\frac{1}{2}$ drachm.
	Castile soap,	8 grains.
	Oil of pennyroyal,	2 drops.

Mix them, and divide the mass into forty pills. Let two pills be taken every morning and evening, till they operate; then, one or two daily to keep the bowels open.

For that obstruction which accompanies consumption, two grains of aloes, with two grains of the dried sulphate of iron, and Venice turpentine enough to make them adhere, may be given two or three times a day for some time.

*Of Painful Menstruation.*—Some females are regular enough as to the period of their monthly “visitations,” but are annoyed greatly, at these times, by the pains they experience, in the lower part of the abdomen, resembling colic or diarrhœa, and obliging them to make frequent efforts to relieve the bowels. This distress commonly lasts only for a few hours, and when the discharge is established, it passes away: but, in other cases, there are severe pains, darting through the loins and pubes, attended with an excessive tightness about the head and weakness of the knees, for some time previous to the discharge. The flow now occurs, not in the thin, fluid form which it usually presents, but in flakes or little masses, sometimes resembling a false membrane which has lined the inside of the uterus. The whole amount of the discharge is generally less than when the secretion is healthy, though sometimes, after the membranous matter is thrown off, the thinner discharge is so abundant as to enfeeble the patient very much; indeed, she always feels more exhausted after painful menstruation, even though the secretion be small. While this state of things exists, the woman has but a slender chance of becoming a mother.



In the treatment of this distressing affection, two things are to be done: First; to relieve the paroxysm. If the patient have a flushed face, a hot skin, full active pulse, and tenderness on pressure upon the uterus, she should be bled, and purged, and should pass half an hour in the hip bath, the temperature of which should be raised gradually, from ninety to one hundred and ten degrees, and then gradually lowered before she leaves it. She must abstain from strong food or heating drinks. If, however, the woman have a feeble, nervous constitution, the above directions will not apply; but in their stead, we should order mild laxatives; such as a Seidlitz powder or two; or a tea-spoonful of sulphur and molasses, or a table-spoonful of spiced sirup of rhubarb, combined with a tea-spoonful of calcined magnesia. After the operation of this purgative, five grains of camphor may be given every two or three hours, in a little ginger sirup, until the pain is abated. We have also known much good to result from the following prescription:—

Take,	Prussiate of iron,	4 grains.
	Powdered ipecacuanha,	$\frac{1}{2}$ grain.
	Powdered opium,	1 grain.

To be taken at once, in a little sirup or molasses.

This has afforded instant relief in several cases in which there was no inflammation. The warm hip bath is extremely useful to the delicate and nervous female, at the time of painful menstruation. In the second place, an effort is to be made to prevent the return of the pain, &c., at the next menstrual period. Upon very high authority, the volatile tincture of guaiacum is recommended as the best medicine for effecting this object. If the patient be free from any inflammatory disposition, she is to take a tea-spoonful of this preparation, each morning, noon, and evening, in a wine-glassful of sweetened milk, or a little sherry, Madeira, or Tenneriffé wine. It is often necessary to continue this medicine for a long time, and it sometimes fails altogether.

*Excessive Menstruation, or Flooding.* Some females have very profuse discharges, regularly and habitually. They appear blanched, thin, or bloated, with waxen countenances. They may have very little pain, but a copious discharge of clotted blood at their monthly period. They become nervous, and complain of shortness of breath, palpitations, and faintness, or are completely overcome by the slightest mental or physical effort. At first, this hemorrhage observes regular periods; but, after a time, the woman seems to be “always unwell;” having a constant dribbling, which wastes her strength,

and at last renders her incapable of exercise. The horizontal posture, repose, a regular state of bowels, and a nourishing, but mild diet, will be proper in such cases. One-fourth of a grain of opium, two grains of sugar of lead, and half a grain of ipecacuanha, should be given every two or three hours, till the discharge is arrested; but the use of this remedy should not be continued long, in the absence of medical advice. An injection of fifteen grains of sugar of lead, a tea-spoonful of laudanum, and two table-spoonful of water, mixed, may be thrown slowly into the bowels. After the discharge is checked, an injection of five or six ounces of cold water should be used twice every day for a long time. It should be passed so gradually, that the bowels will not be stimulated to action; and it ought to be given in bed. This remedy is inadmissible during the regular period for being unwell. As a general tonic, ten drops of elixir of vitriol, one grain of sulphate of zinc, and thirty drops of the tincture of cinnamon may be given in a gill of weak peppermint water, three times a day. The vegetable bitters are less useful than the mineral tonics. When the discharge continues obstinate, and there is reason to suspect the existence of cancer, fungus, or some other organic disease, a careful inspection should be made by an experienced member of the profession, as soon as such advice can be obtained.

*Final Cessation of the Menses.* About the age of forty-five, women, in temperate climates, approach the "time of life." The monthly periods then become irregular, the discharge sometimes diminishing very much in quantity, or remaining absent for several months, and then returning so profusely as to prostrate the patient very much. In other cases, the quantity is so small, and gives so little relief, that the woman is subject to giddiness, dimness of vision, vertigo, pain in the head, or other distressing sensations. In some instances the change takes place without any disturbance. Women, in general, look forward to this period with much anxiety; for there is a popular belief, not without too much foundation in truth, that at, or shortly after this period, diseases of the breast and uterus exhibit themselves.

Those who are subject to much pain or inconvenience on account of this irregularity, should carefully attend to their condition. If they feel much fulness about the head, with pain or giddiness, they should reduce the quantity of food, and abstain from meat and all other animal substances. They should keep their bowels free by frequent and small doses of Epsom, Glauber, or Rochelle salts, or cremor tartar and sulphur; and, if not manifestly relieved by this course, they should lose six or eight ounces of blood from the arm, occa-

sionally; making the intervals between the bleedings longer and longer. Regular, but not violent exercise, in the open air is of the highest importance.

*Leucorrhœa, Fluor Albus, Whites.* Some women are subject to a discharge of a fluid, usually light coloured, but occasionally green or yellow. Sometimes it is thin; at others, thick and adhesive: the quantity varies in different persons, and at different times in the same person. In some individuals it gives no uneasiness, while in others it occasions much constitutional disturbance, breaking down the health of the strongest female by slow degrees.

This discharge is a symptom in various affections of the uterus and vagina. Great mental emotions, severe labours, chronic inflammation or organic disease of the vagina or uterus, a displacement of the latter organ, or unsuitable instruments introduced into the vagina to support it, often produce irritation and discharge.

To relieve this complaint, when there is no organic disease of the uterus, let the patient pay the strictest attention to the cleanliness of her person in general, and of the parts whence the fluid escapes. If she have pain in the back, quick pulse, and headach, with fever, let her lose a few ounces of blood from her arm; let her bowels be purged with Epsom or Glauber salts, or magnesia, alone or with rhubarb; keep her quiet for several days in the horizontal position, till the pain in the head and back, and the fever, are relieved: after this, she may use a solution of a drachm of alum in six ounces of water, cold or warm at option, or half a drachm of sulphate of zinc, dissolved in six ounces of rose water—a part of this to be thrown into the vagina, by a proper female syringe, two or three times a day. A tea made of the black oak bark, or a weak infusion of nut galls, sometimes answers a very good purpose as an injection: so does weak lead water. All the vegetable injections, however, should be avoided as long as there is heat in the parts. Cold water alone, several times a day, will be very useful till the inflammation has passed away, or has been much reduced.

Warm clothing should be worn about the waist and lower extremities of all women subject to this affection. Flannel drawers should always be used in cold weather. We possess much more powerful means for arresting the course of obstinate cases, than those above described; but we do not feel justified in discussing them in a popular treatise.

*Pruritis Vulvæ, Itching of the External Genital Organs.*—The delicate internal lining of the external organs of generation, sometimes becomes the seat of a most distressing itching, to relieve which, the parts may be so irritated by friction, as to become violently inflamed. Leeches have been used some-

times with benefit; so has the application of cold; as ice water, or even lumps of ice introduced into the vagina. When there is an eruption like that in the sore mouth of children, injections of a strong solution of borax have been very useful; thick starch water with a solution of sugar of lead, injected into the vagina, and retained for an hour or two, have been also of great utility in a few cases under our care. This irritation sometimes arises from disease of the uterus, pregnancy, the presence of a stone in the bladder, or worms in the bowels. The original affection must first be attended to in these cases, as elsewhere directed.

*Falling or Prolapsus of the Uterus.*—The uterus is so situated in the human female as to be subject to a variety of displacements, some of which excite so much influence on the health of the individuals who have incurred such accidents, that a few observations on the subject appear peculiarly necessary in a work like the present.

The most common displacement is, perhaps, the *descent, falling, or prolapsus* of the womb. In this case the uterus becomes too much depressed towards the bottom of the vagina; so that its mouth lies upon the lower surface of the passage, producing a slight bearing down sensation in the part, and some dull or acute pain in the back, especially when the patient is long upon her feet. This pain disappears soon after lying down, and the patient rises in the morning apparently well. Soon after the business of the day commences, her pain and distress return. A discharge of whites now presents itself, if, indeed, it have not preceded, or caused the accident. The inconvenience goes on increasing, under common exercise, till the patient becomes feeble, nervous and dyspeptic, the local suffering may now become worse, or it may be lost in the impression of pains low down on the left side of the abdomen and under the short rib, dragging and distressing soreness about the loins, tenderness of the lumbar vertebra, dragging and colic, pains about the umbilicus, and, perhaps, costiveness and painful or difficult urination. But a sudden fall, lifting a heavy weight, tight lacing in the ball room, or a walk or ride over a rough road, may produce sudden displacement. The woman is instantly seized with pain at the bottom of the stomach, in one of the hips, or all round the back; with a strong bearing down, an inclination to pass her water every minute, or an impulse to evacuate her bowels. She may become faint, or have a paroxysm of hysterics. Under these circumstances, it often happens that the uterus has been suddenly depressed almost to the orifice of the vagina, pressing upon the rectum and the neck of the bladder, so much as to cause the inclination to evacuate them.



If this state of things be long neglected, the bladder may almost assume the position of the uterus, and the latter may slip entirely out of the body. The whole organ is now suspended between the thighs of the wretched patient, and her sufferings commonly exhaust her physical and mental energies. Yet such is the vigour of constitution in some women, that they move about, and attend to laborious business without evincing, to a mere spectator, the existence of any special disorder. This sudden affection is to be treated by rest on the back in bed, with the hips raised, when the displacement is in the first degree, and of recent occurrence. The same remedies are proper when the disorder has reached the second stage, (the mouth of the womb presenting at the external orifice,) except that it is then often necessary to restore the womb to its natural situation by pressing it upward and backward by a finger or two passed into the vagina. If there be any pain in this operation, the vagina should be well washed by injections of thick flaxseed or slippery elm bark tea, for a day or two before the astringent washes are used.

When the womb has passed completely out of the vagina, which is always drawn down and inverted, the parts sometimes become suddenly so swelled that it would be impossible, as well as improper, to return them at once. The inflammation is to be reduced by leeches, ice water, or warm fomenting poultices of bread and milk, or hops and flaxseed, continually applied until the swelling and pain subside; then, with the hand well oiled, and the patient's hips well elevated upon a cushion or pillow at the edge of the bed, the organ is to be passed carefully within the vagina, and restored to its natural situation. The bowels and bladder must be regularly evacuated; but the patient should not be allowed to rise for several days, and should even then assume the upright position very gradually and cautiously, after having used anodyne and astringent injections from the first. The injections to be used for the support of the vagina and uterus should be made of the following ingredients.

Take one drachm of alum and dissolve it in half a pint of clear water; or, half an ounce of the inner bark of the black oak, with three gills of water; boil down to a pint and strain. Two ounces of either of these preparations should be injected into the vagina, by means of a syringe, the extremity of which should be perforated with a number of orifices, to convey the fluid to different points of the surface on which it is to act. The syringe invented by Dr. Chase, of Philadelphia, we consider the best. This operation should be repeated twice a day, for a week or more; the syringe being always well lubricated with lard or oil, that it may be introduced without difficulty or pain.

From thirty drops to a tea-spoonful of laudanum may be used in the injection, when there is much sensibility; and this may be repeated every day or two till the sensibility disappears. The patient may now be allowed to move about her room; and if she discover no return of the symptoms, she may gradually resume her domestic duties, avoiding for a long time any efforts at lifting, long walks, &c.

If there be frequent relapses, or if the case be chronic, she should wear a pessary, which should be accurately adjusted; but this and all other instrumental means of support, should be directed by a professional gentleman who should be made acquainted with the case.

Most of the pessaries commonly on sale, (none of which are adapted to the whole round of cases,) and all the "abdominal supporters" known to us, are injurious instruments.

*Retroversion, or Falling of the Womb backwards.* The uterus is also liable to falling backwards, so that its body, or rather its very top part, presses upon the bowel behind, while the mouth, instead of over-hanging the lower part of the vagina, is drawn upward so as to press against the neck of the bladder, which, soon becoming distended, very much increases the difficulty, and renders the escape of urine, as well as that of the contents of the bowels, almost impossible, the distress from bearing down is very great, and immediate relief is necessary. The parts should be examined by the finger passed into the vagina, when a tumour will be felt obstructing the passage, making it very short, and pressing upon the bowels. No neck or mouth of the uterus can be found, unless it can be felt, very high upwards, just behind the arch of the pubes. The management of this affection is purely surgical, and must be confided solely to experienced men.

The bowels and bladder should be kept open by glisters, and the patient ordered to remain in bed till she can be seen by a physician or surgeon. If a practised female accoucheur be present, she should always use the catheter, immediately, to ascertain the nature of the case.

*Antiversion of the Womb.* The unimpregnated uterus is also liable to fall forwards; but this extremely rare difficulty is intelligible to surgeons alone.

*Of Polypus and Cancer of the Womb.* Under the head of *Flooding*, we alluded to the hemorrhage arising from polypus and cancer. We come now to make a few observations in relation to each of these affections, merely to point them out to those who are liable to suffer from them; for we are fully persuaded that these cases should never be left to run their course without claiming the attentive consideration of the surgeon-accoucheur.

*Polypus of the Uterus.* When the woman has been wasting away for some time, under a more or less copious discharge of blood, and the remedies recommended under the head of flooding have been faithfully, but unsuccessfully used;—when, during this time, she has remained free from burning and pain in the part, but has merely complained of a sense of weight in the womb,—there is great reason to suppose that she has a polypous excrescence growing there. This polypus may spring from any part of the inner surface of the womb: When it arises from the body, or considerably within the neck of the organ, it cannot be detected until it distends the mouth sufficiently to admit the point of the finger; or, until the polypus itself descends into the vagina. In the latter case, it may be found smooth and round, from the size of a walnut to that of a child's head. As it grows, (which it sometimes does very rapidly,) it causes much uneasiness by its weight and by distending the parts. The disease being recognised by these signs, the best advice should be sought immediately.

*Cancer of the Uterus.* Some women of active habits and close devotion to their occupations may, at times, have their attention called to a sudden pain which shoots through the bottom of the abdomen, and either disappears entirely, or leaves after it a dull aching or a gnawing sensation, accompanied by more or less discharge of a fluid, which is sometimes pale and thin, but soon becomes thicker, yellower, perhaps streaked with blood, and very offensive. This pain is gradually rendered more severe and almost constant, and an exhausting hemorrhage sets in at times, perhaps continuing until checked by fainting. In other cases, women of leisure and more delicate temperament, discover a burning heat, followed by a fetid discharge of matter mixed with streaks or spots of blood. At their monthly periods, or even in the intervals, they may have a copious irruption of blood which blanches their skins, and gives them a waxen, yet bloated countenance. There is then too much reason to fear the presence of some malignant disease of the uterus;—either true cancer, or some kindred and equally fatal affection.

The only domestic treatment which can safely be administered, in this disease, will be merely palliative. Cleanliness, fresh air, plain nutritious diet, regulation of the bowels, and tranquillity of mind, are all that can be recommended in a work like this. The woman who has the misfortune to be visited with this affection must resolutely determine to retire early from the active duties of life, and be content to abstain from indulgences which would heat the system, excite her passions, and increase the circulation of blood. Bland, soothing nourishment, and local applications, are all that can be administered until she can

have judicious and experienced medical assistance. Her bowels should be kept open by the mildest laxatives that will effect the object, the fetid and erosive discharges should be washed away by injections of flaxseed tea, Castile soap-suds, or a solution of chloride of lime or soda, with a little hop or chamomile tea. When the hemorrhage becomes very profuse, the vagina should be plugged up with a fine sponge, or a strip of fine rag, imbued with strong alum water.

Formidable as the last two diseases are, they are not always beyond the reach of surgery.





## APPENDIX.

---

### FORMULARY.

List of Preparations mentioned, but without details, in the body of the work, and which may be prepared at the residence of the patient. Those marked with an \* are not prepared exactly in accordance with the custom of Pharmacutists, but are either simplified to accommodate the domestic adviser, old hospital prescriptions which have never been published, or modifications employed by the author.

#### *Alum—Burnt or Dry.*

Take any quantity of alum, and heat it on a clean shovel, over a fire. It will melt in its own water of crystallization, and boil for some time. When it becomes perfectly dry, let it cool, and then reduce it to a fine powder in a mortar.

#### *Asafœtida Mixture.*

##### *Asafœtida Tea—Milk of Asafœtida.*

Take of,	Asafœtida,	2 drachms.
	Pure water, boiling,	$\frac{1}{2}$ pint.

Pour the water gradually upon the gum in a mortar, rubbing the mixture from time to time, and decanting the first portions of the mixture, before each addition of the hot water. The result is a milky fluid. It will not bear keeping many days. It is a powerful antispasmodic, and a stimulating expectorant. Dose, for an adult, a table-spoonful.

#### *\* Blister Ointment.*

Take of,	Simple Cerate, any required quantity.
----------	---------------------------------------

Warm it, and mix it with powdered Spanish flies, by rubbing in the powder with a knife or spatula, until the mixture

shows a disposition to crumble. The back of a plate or dish will present a good surface for making the mixture. When spread on leather or muslin for use, it is well to warm the surface of the plaster, and then dust it with the dry powder of the fly, allowing all that adheres to remain.

\* *Brown Mixture.*

Take of,	Extract of liquorice,	3 drachms.
----------	-----------------------	------------

Dissolve it in five ounces of boiling water, by rubbing it in a mortar, and adding the water gradually.

Then add,	Powdered gum Arabic,	2 drachms.
-----------	----------------------	------------

Let the mixture cool, and add—

Antimonial wine,	2 drachms.
Acetic tincture of opium,	1 drachm.

This is a valuable expectorant. The same quantity of laudanum, or three times the quantity of paregoric elixir, may be substituted for the acetic tincture of opium, if this be not at hand. Dose, for an adult, a table-spoonful every two or three hours.

*Camphor Mixture.*

Camphor,	1 drachm.
Alcohol,	20 drops.
Calcined magnesia,	$\frac{1}{2}$ drachm.

Powder the camphor with the alcohol in a mortar, next add the magnesia, and rub the ingredients well together, then add, gradually, one pint of pure water, continuing the triturations. When complete, filter the mixture through paper. If alcohol cannot be procured, proof spirits will answer tolerably well, in four times the quantity.

This is an anodyne, antispasmodic, and diffusible stimulant. Dose, for an adult, one or two table-spoonsful every hour or two.

\* *Camphor Julap.*

Take of,	Camphor,	1 drachm.
	Alcohol,	10 drops.

Triturate these in a mortar, then add—

White sugar,	2 drachms.
Powdered gum Arabic,	2 drachms.

Triturate again, thoroughly, and add—

Boiling water,	6 ounces.
----------------	-----------

Boiling milk may be substituted, to advantage, for the water, in this preparation. Dose, for an adult, a table-spoonful every hour or two.

*\* Cerate of Impure Carbonate of Zinc.*

*Turner's Cerate.*

Take of,	Carbonate of zinc,	2 drachms.
	Simple cerate,	1 ounce.

Rub the carbonate into a fine powder on the back of a plate with the knife or spatula, then add it by degrees to the simple cerate, previously warmed, and rubbed on the back of another plate. Mix them thoroughly by rubbing. If the simple cerate be quite hard when cold, substitute a little lard for a portion of the cerate—and rub it well in before adding the zinc.

These directions differ a little, but not essentially, from the more troublesome officinal orders for preparing the article.

*Cerate—Simple.*

Take of,	White wax,	1 pound.
	Lard,	4 pounds.

Melt them with a gentle heat, and stir till cool.

Yellow wax will answer all domestic purposes equally well.

For other cerates, see *Ointment*.

*\* Chalk Mixture.*

Take of,	Prepared chalk,	2 drachms.
	Powdered gum Arabic,	2 drachms.
	Tincture of opium, (laudanum,)	1 drachm.
	Pure water,	6 ounces.

Mix in a mortar.

An astringent and antacid. Dose, for an adult, a table-spoonful every three, four, or six hours. *The common chalk*



*mixture* of the Dispensatories, is prepared without the laudanum.

\* *Chalk Mixture with Kino.*

Take of,	Chalk mixture,	6 ounces.
Add,	Tincture of kino,	2 drachms.

This is powerfully astringent. Dose, as in the last prescription. By doubling the quantity of the laudanum and tincture of kino, we form the prescription for the premonitory stage of Asiatic cholera, mentioned at page 453.

\* *Decoction of Cantharides.*

Take of,	Powdered cantharides,	$\frac{1}{2}$ an ounce.
	Spirits of turpentine,	1 gill.

Boil them together, for half an hour, in an earthen vessel or an oil flask, on the top of a hot stove, covered with house-sand.

This is a powerful rubefacient. It is exceedingly inflammable, and must never be brought near the fire.

*Decoction of Oak Bark.*

Take of,	Oak bark,	1 ounce.
	Water,	1 quart.

Boil them down to a pint, cool, and decant.

*Decoction of Uva Ursi.*

Take of,	Bear-berry leaves ( <i>arbutus uva ursi</i> ),	1 ounce.
	Boiling water,	1 pint.

Boil for ten minutes, in an earthen vessel, and strain.

Dose, for an adult, a wine-glassful every three or four hours.

*Decoction of Quince Seed.*

Take of,	Quince seeds,	2 drachms.
	Boiling water,	1 pint.

Boil over a slow fire, for ten minutes, and strain.

This is a simple mucilage.

For other decoctions and hot infusions—see *Infusions*.

*Dover's Powder.*

Take of,	Powdered opium,	15 grains.
	Powdered ipecacuanha,	15 grains.
	Sulphate of potassa,	2 drachms.

Mix them well, in a mortar, and divide any quantity of this mixture into powders containing ten grains each.

We prefer, for convenience, and for some other reasons the following:—

*\* Substitute for Dover's Powder.*

Take of,	Nitrate of potassa, (salt petre,)	2 drachms.
	Opium in powder,	12 grains.
	Ipecacuanha in powder,	12 grains.

Mix them very thoroughly, in a mortar, and divide the mixture into twelve powders.

*Effervescing Draught.*

Take of,	Sub-carbonate of potassa, (pearl ash.)	3 drachms.
	Water,	6 ounces.

Mix them in a six ounce vial. Then—

Take of,	Fresh lemon juice,	3 ounces.
	Water,	3 ounces.

Mix them in another six ounce vial.

Mix two table-spoonsful of the latter mixture, with one of the former, in a small cup, and let it be taken while foaming.

*\* Infusion of Bone-set.**Bone-set Tea.*

Take of,	The dried leaves of Bone-set, ( <i>Eupatorium perfoliatum</i> ,)	$\frac{1}{2}$ an ounce.
	Boiling water,	1 pint.

Let the tea draw over the stove or before the fire in a covered earthen vessel, for twenty minutes. The modes of administering this highly valuable infusion are various. In severe colds, when the object is a powerful perspiration, it should be taken as hot as possible, and always when the patient is covered warm in bed. An adult should take half the above quantity as rapidly as its heat will permit—the remainder, again

heated, may be taken in two doses, at intervals of half an hour. When used as a tonic, it should be taken quite cold, in doses of a wine-glassful every two hours. When taken moderately warm, it often produces vomiting, and if made of twice the above named strength, it constitutes an emetic, popular in country places, but disagreeable in its operation.

*Infusion of Cascarilla.*

Take of,	Cascarilla bruised,	1 ounce.
	Boiling water,	1 pint.

Let the mixture digest in an earthen vessel over a warm stove, or before the fire, for two hours without boiling. Dose for an adult, a wine-glassful every three, four, or six hours. It is a tonic.

*Infusion of Chamomile.*

*Chamomile Tea.*

Take of,	Chamomile flowers,	$\frac{1}{2}$ an ounce.
	Boiling water,	1 pint.

Let it draw before the fire for ten minutes, and strain. This is taken generally cold, as a tonic—Dose, a wine-glassful, frequently.

*Infusion of Columbo.*

Take of,	Columbo root, in slices,	$\frac{1}{2}$ an ounce.
	Boiling water,	1 pint.

Let it simmer for half an hour, in an earthen or iron vessel. This is a powerful tonic. It will not bear being kept beyond two or three days. Dose, a wine-glassful or less every six hours.

*\* Infusion of Flaxseed.*

Take of,	Flaxseed,	1 tea-cupful.
	Boiling water,	1 quart.

Tie the flaxseed in a clean piece of linen; then pour upon it the boiling water, and let them stand over the stove or near the fire, for an hour or two; taking care that the temperature of the fluid be not permitted to reach quite to the boiling point. Decant the liquor, and if it be designed for a drink, let it be sweetened, to the taste of the patient, with brown sugar. If desired, and admissible, a little lemon juice may be added.

Prepared in the usual way, by boiling, the flaxseed tea becomes extremely injurious to the tone of the stomach; but when

made in accordance with the directions just given, it is a delightful mucilage. This prescription differs from the official preparation, principally in the substitution of brown sugar for liquorice, which is a decided improvement.

*\* Infusion of Galls.*

Take of,	Bruised galls,	2 drachms.
	Boiling water,	$\frac{1}{2}$ a pint.

Let the mixture stand covered in an earthen vessel, and in a warm place for two hours. Then strain it, and add,

Rose, Cinnamon, or Mint water,	2 ounces.
--------------------------------	-----------

This is a strong astringent. Dose, for an adult, a table-spoonful every two hours. Without the aromatic, it is often useful as an external application.

*\* Infusion of Horse-mint.*

Take of,	The dried leaves of Horse-mint, ( <i>monarda punctata</i> ,)	$\frac{1}{2}$ an ounce.
	Boiling water,	1 pint.

Let the mixture stand covered in an earthen vessel, and in a warm place for twenty minutes. Then cool and decant it. This is a valuable article in protracted vomiting, when not caused by organic disease or high fever. It is very useful in sea-sickness. Dose, a wine-glassful taken frequently. It is an excellent substitute for liquor, when given to the intemperate who attempt reformation. It should be taken cold.

*Infusion of Quassia.*

Take of,	Quassia rasped,	2 drachms.
	Water, cold,	1 pint.

Let the mixture digest twelve hours, and strain. This is an excellent bitter tonic. Dose for an adult, a wine-glassful three times a day.

*Infusion of Senna.*

*Senna Tea.*

Take of,	Senna,	$\frac{1}{2}$ an ounce.
	Coriander seed, bruised,	$\frac{1}{2}$ a drachm.
	Boiling water,	$\frac{1}{2}$ a pint.

Let them stand for an hour in a warm place, then strain,



and let the mixture cool. Half this quantity is a dose for an adult, but it may be repeated in four or six hours, if necessary. It is a powerful purgative, and prone to produce some griping.

Some other infusions are mentioned in the body of this work, but when express directions for their preparation are not given, it is presumed that the general knowledge of these simple remedies renders unnecessary any formal prescription.

#### *Lime Water.*

For domestic use lime water is best prepared thus—

Take of,	Unslacked lime,	about $\frac{1}{2}$ a pound.
	Very pure water,	2 or 3 quarts.

Place the lime in a wide-mouthed earthen vessel, and pour the water upon it. Let the mixture stand a few minutes; then stir it well and decant it into clean porter bottles before the lime subsides. Cork the bottles tightly, and, if designed for long keeping, seal them. When used, the lime water is to be poured off without agitation, and only that which is perfectly clear should be used. The slightest access of the air rapidly spoils lime water; and even a cork will not prevent its being changed in a few months, unless covered by sealing. It can be readily prepared extemporaneously; but in countries where the spring or river water is not pure, distilled water or rain water collected directly in a wide-mouthed, clean vessel will be required.

#### *Neutral Mixture.*

##### *Saline Draught.*

This can be more elegantly and correctly prepared by the apothecary; but in places where such aid cannot be had, the following method will answer every purpose.

Take of,	Fresh lemon juice,	2 ounces.
	Sub-carbonate of potassa, (pearl-ash)	1 drachm.
	Pure water,	4 ounces.

Put the lemon juice into an eight-ounce vial, and dissolve the potash in another vessel containing about a gill of pure water. Drop the solution of potash into the lemon juice, at first pretty rapidly, then slowly; shaking the vial occasionally, until the effervescence nearly ceases. Then add more potash, drop by drop, tasting the mixture from time to time, until no acid taste is perceived, and the last drops produce no very perceptible effervescence. Be very careful not to add too much potash, for it is better to err a little on the other hand. The mixture completed, add a little loaf sugar, and let the vial stand open for an hour, before corking it.

This is a delightful diaphoretic in long continued fevers with irritability of stomach. In its preparation, mint water is sometimes substituted for pure water. Dose, a table-spoonful every hour.

*Nitro-Muriatic Acid Bath.*

Take of,	Nitric acid, by measure,	2 ounces.
	Muriatic acid, by measure,	4 ounces.
	Water, in a narrow, deep bucket,	8 gallons.

Mix them, and use as a bath for the feet and legs twice or three times a week. When employed in disease of the liver, it is well to bathe the surface over the organ with the same mixture, by means of a sponge. The mixture may be kept in a cool, dark place, and may be used repeatedly without renewal, for two weeks.

We have added two gallons more water than is directed in the U. S. Dispensatory, having found this strength sufficient.

*Ointment of Basilicon.*

Take of,	Good resin,	5 parts.
	Lard,	8 parts.
	Yellow wax,	2 parts.

Melt them together, or stir the mixture till cool.

\* *Ointment of Cicuta.*

Take of,	Extract of cicuta,	2 drachms.
	Simple cerate,	$\frac{1}{2}$ an ounce.

Rub them well together on the back of a plate, with a knife or spatula.

\* *Ointment of Celandine.*

Take of,	The expressed juice of fresh celandine,	1 ounce.
	Lard,	$\frac{1}{2}$ an ounce.

Melt them together, and evaporate the watery parts, stirring the mixture frequently.

*Kentish Ointment.*

Take of,	Basilicon ointment,	4 ounces.
	Spirits of turpentine,	$\frac{1}{2}$ an ounce.

Rub them well together.

*Ointment of Red Precipitate.*

Take of,	Red oxide of mercury, (red precipitate,) finely powdered,	1 drachm.
	Simple cerate,	1 ounce.

Warm the cerate, then add the precipitate, gradually rubbing it in, thoroughly and evenly, with a knife or spatula.

*Ointment of Savine.*

Take of,	Basilicon ointment,	1 ounce.
	Savine, finely powdered,	1 drachm.

Soften the ointment by heat; then add, the savine, slowly, and mix the articles, thoroughly and evenly, with a knife or spatula.

*\* Ointment of Stramonium.**Ointment of Thorn Apple, or Jamestown Weed.*

Take of,	Extract of stramonium,	1 drachm.
	Simple cerate,	$\frac{1}{2}$ an ounce.
	Lard,	2 drachms.

First, rub the cerate and the lard together; then add the extract, and make a smooth mixture of the same colour throughout.

This is a substitute for the officinal preparation, which, being made of the fresh leaves of the plant, can be prepared only at one season of the year.

*Tar Ointment.*

Take of,	Tar,	1 ounce.
	Suet, or simple cerate,	1 ounce.

Melt the suet or cerate with a gentle heat, and stir the mixture till cool.

*\* Ointment of White Precipitate.*

Take of,	Ammoniated mercury, (white precipitate,)	1 drachm.
	Simple cerate,	1 ounce.

Soften the cerate, and thoroughly rub in the white precipitate.

*Camphorated Ointment of White Precipitate.*

Take of,	Simple cerate,	1 ounce.
	Powdered camphor,	1 drachm.
	Muriate of ammonia,	2 drachms.
	White precipitate of mercury,	2 drachms.

Melt the cerate in an earthen vessel, then add the other ingredients, and stir till cold. Rub the cold cerate on the back of a plate, with a knife or a spatula, until the mixture is perfectly made.

This ointment acts powerfully on the skin, giving rise to a cutaneous eruption. Its application must not be carried too far, and when used by women and children it may be reduced in strength one half, by adding simple cerate.

The citrine and Goulard's ointments, several times prescribed in the body of this work, cannot be well prepared at the residence of the patient, but must be procured from the apothecary. The lard used for ointments must be perfectly free from salt.

*Charcoal Poultice.*

Take a sufficient quantity of fresh charcoal, (that made by extinguishing live coals with dry sand being best) reduce it to a fine powder, and mix it with the flaxseed poultice, or with simple Indian mush.

*Flaxseed Poultice.*

Boil flaxseed meal, in just sufficient water to make a poultice of proper consistence.

*Fermenting Poultice.**Yeast Poultice.*

Take of,	Flour,	$\frac{1}{2}$ a pound.
	Yeast,	1 gill.

Mix, and set the mixture in a warm place, to rise. When it begins to rise, it is ready for use.

*\* Cicuta Poultice.*

Take of,	Dried leaves of cicuta, ( <i>conium maculatum</i> ),	1 part.
	Crumbs of stale bread,	1 part.



Boil these in milk mixed with one-third its bulk of water, using just enough to make the mixture, after boiling, of a suitable consistence for a poultice.

We greatly prefer this mode of preparation, to that directed in the systematic works.

*Carrot Poultice.*

Boil the sliced roots of the carrot in water, until soft enough for a poultice.

The chamomile, hop, and other poultices, mentioned in this work, are all prepared on the same principle with the carrot poultice. The hop is sometimes stewed in vinegar and water, when intended for an external application to sound skin. The hop pillow is prepared in this way. The bread and milk poultice is too well known to need description.

*Solution of the Pith of Sassafras.*

Put four or six inches of the pith from the thicker stems of sassafras, or a proportionate quantity from the lesser branches, into a six-ounce vial, containing a gill of pure, fresh, cold water.

Cork the vial, and agitate it frequently, for ten minutes. The solution is then ready for use as an application to the eye. If intended for an injection, prepare a larger quantity, let it stand in a warm place for two hours; then again agitate it, throw the solution, with the pith, into a piece of linen, over a suitable vessel, and express the mucilage by twisting the cloth.

In the first preparation, the pith will bear to have the water several times replenished before the mucilage becomes exhausted.

*\* Spice-Plaster.*

Take of,	Powdered cloves,	1 tea-spoonful.
	Ground cinnamon,	1 tea-spoonful.
	Ground alspice,	1 tea-spoonful.
	Ground black pepper,	$\frac{1}{2}$ a tea-spoonful.
	Flour,	3 or 4 tea-spoonsful.

Mix them into a paste with vinegar—and spread them upon muslin.

If powerful local stimulation be required, Cayenne may be substituted for black pepper. The exact relative quantity of

the several spices is not important; but no more flour than is necessary to unite them should be used. The cloves and pepper are more important than the other aromatic ingredients, and if either of the latter be omitted, their place should be supplied by an additional amount of cloves.

*Spirit of Mindererus.*

*Solution of Acetate of Ammonia.*

Take of,	Good pure vinegar,	6 ounces.
	Muriate of ammonia, ( <i>sal ammoniac</i> ),	
	a sufficient quantity.	

Drop the powder very slowly into the vinegar, in an open vessel, and continue adding, until the effervescence becomes scarcely perceptible.

This is an excellent diaphoretic in fevers. Care must be taken to stop adding the powder before the effervescence has entirely ceased; for the decomposition of the salt goes on slowly toward the conclusion of the process, and it is better that the acid in the mixture should be in very slight excess. If the solution be kept in a vial, it should be left open for a few hours before corking. Dose, for an adult, a table-spoonful or two, taken every two or three hours.

*Spirit of Camphor.*

Camphor is dissolved without limit, in alcohol. A good proportion for domestic use is an ounce of camphor to a pint of alcohol. A few drops of alcohol in a mortar are necessary to enable us to powder camphor, when the powder is wanting for pills or ointments.

*Terebinthine Mixture.*

*Turpentine Mixture.*

Take of,	Spirit of turpentine,	1 drachm.
	Laudanum,	1 drachm.
	Loaf sugar,	2 drachms.
	The whites of two eggs,	
	Pure water,	6 ounces.

Let the white of egg be placed in a six ounce vial. Then pour over it, the spirit of turpentine, the laudanum and a little water. Shake the vial well. Dissolve the sugar in a little water, add it to the mixture and again shake the vial. Then fill the vial with water, by little and little,—agitating it at each addition. Dose, for an adult, one or two table-spoon-

fuls every three hours in cases of collapse. If the mixture be designed for a purgative, the turpentine may be doubled in quantity, and the laudanum must be omitted.

*Volatile Liniment.*

Take of, Spirit of hartshorn, ( <i>aqua ammoniæ</i> ),	
by measure.	1 part.
Sweet oil, by measure,	4 or 6 parts.

Shake them together in a vial.

The weaker preparation is the more elegant; but the stronger may be employed, when powerful local stimulation is desired.

## LIST

OF

SOME OF THE PRINCIPAL DRUGS, &C., MENTIONED IN  
THIS WORK.

As many of those for whose use the present work is written, are placed beyond the reach of pharmaceutical assistance, and are very properly in the habit of keeping medicine chests for the use of their families or establishments; it is deemed advisable to add a list of a few of the drugs and implements, mentioned in the work, which are fitted for occasional use in families. The physician, when called upon an emergency, will be glad to find these articles accessible, and all necessary additions to the list may be advantageously made by his advice; for they will then be better adapted to the peculiar routine of practice to which he may have become attached. It is thought useless to add an estimate of quantities, whether relative or absolute; for these must be determined by the number of persons to be supplied, the location of the family, and other circumstances. The advice of an experienced and honest dealer will supply the absence of any directions from us, on this subject.

### LIST OF DRUGS.

Acetate of lead, (*Sugar of lead*.)  
Acetic tincture of opium, (*Hartshorne's*.)  
Alcohol.

- Aloes.  
 Alum.  
 Alspice.  
 Antimonial wine.  
 Armenian Bole.  
 Bone-set tea—the herb, (*Eupatorium perfoliatum*.)  
 Borax.  
 Burgundy pitch.  
 Calomel.  
 Camphor.  
 Cantharides, (*Spanish flies*.)  
     Tincture of,  
 Carbonate of iron.  
     of lime, (*Prepared chalk*.)  
     of potassa.  
     of zinc, (*Lapis caliminaris*.)  
 Carolina pink-root, (*Spigelia marilandica*.)  
 Cascarilla bark.  
 Castor oil.  
 Caustic potassa, (*Vegetable caustic*.)  
 Chamomile flowers.  
 Chloride of soda.  
     of lime.  
 Cicuta leaves, (*Conium maculatum*.)  
 Chinchona, (*Peruvian bark*.)  
 Cinnamon.  
     Tincture of,  
     Water.  
 Citrine ointment.  
 Cloves.  
 Columbo root.  
     powdered  
 Coriander seed.  
 Coxe's hive sirup.  
 Croton oil.  
 Elixir of vitriol, (*Aromatic sulphuric acid*.)  
 Ergot, (*Spurred rye*), powdered.  
 Extract of cicuta, (*Conium maculatum*.)  
     of dandelion, (*Leontodon taraxacum*.)  
     of liquorice.  
     of stramonium.  
 Flaxseed.  
 Galls powdered.  
 Gentian root.  
     powdered.  
 Goulard's cerate, (*Cerate of sub-acetate of lead*.)  
 Gum ammoniac.  
     Arabic.  
     powdered.



Gum asafoetida.

Gum guaiacum.

powder of,  
volatile tincture of,

Gum kino.

tincture of,

Hoffman's anodyne.

Horse mint—the herb, (*Monarda punctata*.)

Huxham's tincture of bark.

Ipecacuanha—powdered.

India rubber in sheets or cloth.

Jalap.

Juniper oil.

Lavender compound.

Laudanum, (*Tincture of opium*.)

Magnesia calcined.

Meadow saffron, (*Colchium autumnale*.)

The tincture of the leaves or that of the root.

Mercurial ointment.

plaster.

Mercury, red precipitate of,

white precipitate of,

Muriate of ammonia, (*Sal ammoniac*.)

of iron, tincture of,

Nitric acid.

Nitrate of silver, (*Lunar caustic*.)

of potassa, (*Saltpetre*.)

Oak bark.

Opium.

powdered.

Opodeldoc.

Paregoric elixir.

Pennyroyal—the herb, (*Hedeoma pulegioides*.)

the oil.

Pepper, black,

Cayenne,

Peppermint, the oil.

water.

Pith of sassafras.

Quassia.

Quince seeds.

Resin.

Rhubarb.

Rose water.

Savine leaves, powdered.

Seidlitz powders.

Senna.

Slippery elm bark.  
 Soap liniment.  
 Spiced sirup of rhubarb.  
 Spirit of ammonia or hartshorn, (*Aqua ammoniæ*).  
 Squills, the sirup.  
 Sulphate of copper.  
     of iron.  
     of magnesia, (*Epsom salts*).  
     of potassa.  
     of quinine.  
     of zinc.  
 Sulphur, flowers of.  
 Sulphuric ether.  
 Super-carbonate of soda.  
 Super-tartrate of potassa, (*Cremor tartar*).  
 Sweet oil.  
 Sweet spirits of nitre.  
 Tar.  
 Tartar emetic.  
 Turpentine—Venice.  
 Uva ursi—the leaves.  
 Valerian root, powdered.  
     ammoniated tincture of,  
 Wax, white.  
     yellow.

---

## LIST

OF

SURGICAL AND PHARMACEUTICAL ARTICLES WHICH ARE  
 DESIRABLE FOR PRINCIPALS OF LARGE ESTABLISH-  
 MENTS.

1. A surgeon's pocket case, containing—  
     one pair of dressing scissors.  
     one pair of operating scissors.  
     two scalpels.  
     two curved bistouries.  
     one straight bistoury.

- one probe-pointed bistoury.
- one dressing forceps.
- one anatomical forceps.
- two silver probes.
- one abscess needle.
- one gum lancet.
- one spatula.
- one thumb lancet, to be exclusively used for vaccination.
- four curved surgeon's needles.
- one silver female catheter.
- 2. A cupping syringe and glasses.
- 3. A quart injecting syringe.
- 4. A gill do. do. for children.
- 5. One Chase's female syringe.
- 6. Half a dozen or more gum elastic catheters, assorted.
- 7. One gum elastic stomach tube.
- 8. One spring lancet with two thumb lancets in the same case.
- 9. Muslin, linen, buckskin, and sheep skin for dressings.
- 10. Some skeins of good, strong sewing silk for ligatures.
- 11. Three yards of coarse unglazed domestic muslin for fractures, with two pieces of tape, one inch broad.
- 12. Ten yards of unglazed domestic muslin, torn into bandages, from two and a half, to three fingers' breadths in width, and rolled.
- 13. A piece of cotton wadding.
- 14. Half a pound of patent lint.
- 15. A roll of tow.
- 16. One mortar, of Wedgewood's ware, for mixtures, holding one pint.
- 17. One mortar, of Wedgewood's ware, for powders, holding half a pint.
- 18. Two apothecary's spatulas.
- 19. Several cedar shingles, planed thin.
- 20. A piece of half-inch, fine panel white-pine board, without a knot, six feet long by two wide; or two pieces of half the width, smoothly planed.

With these articles, kept in an accessible place, there are few sudden accidents which would be found unprovided for. No vessel should be permitted to go to sea without them, and on large estates, or in extensive manufactories at a distance from cities, they should never be wanting. Even isolated families would find it to their advantage to provide space enough for all the articles, except, perhaps, the first and second items, which form the most expensive part of the apparatus.

## TO

B76C

Caouchouc. See <i>India Rubber</i> .	
Capillaries, anatomical structure and functions of,	91
Cartilages, articular, anatomical definition,	35



	Page.		Page.
Cavity of the abdomen, limits of the,	81	Clothing, on silk as an article of,	191
Cellular tissue, anatomical structure of the,	25	Clothing, on wollen and flannel as articles of,	192
Cerebellum, or lesser brain,	119	Clothing, principles which should regulate the choice of materials for,	189
Cerebrum, or greater brain,	120	Collapse, physiological definition of,	139
Chewing of tobacco, hygienic remarks on,	174	Collar bone, definition,	47
Children and old persons require most clothing,	194	Colon, or great intestine, functions and anatomy of the,	81
Children, exercise and manners of, erroneous popular proverbs concerning the,	222	Colon, valve of the,	80
Children, false doctrine, that children are hardened by exposure with light clothing—cruel sacrifices to this doctrine,	183, 190	Cotton, viewed as an article of dress,	190
Children, food of. See <i>Food</i> .		Counter-irritation, physiological explanation of,	144
Children require more food than adults,	176	Coccygis, os, see <i>Pelvis</i> .	
Children, that "children thrive best in the dirt," an erroneous popular proverb,	195	Cranium, osseous structure of the,	43
Chyme, definition of,	75	Cuticle, or scarf-skin, anatomical character of the,	109
Circulating fluids, of the,	83	Cuticle, shed annually,	196
Circulation, anatomy of the,	83	Cuticle, removal of the surplus cuticle necessary to health and cleanliness,	195
Circulation, route of the,	86	Cutis vera, or true skin, anatomical character of,	108
Clavicle. See <i>Collar Bone</i> .			
Clerks, their in-door exercises unhealthy,	206	D.	
Clothing, changes of, which are admissible at different hours of the day or night,	194	Diet, see <i>Food</i> .	
Clothing, children and old persons require most,	194	Digestion, function of,	70
Clothing, dangers of the partial exposures of the person by peculiarities of dress,	186	Digestive apparatus, anatomical description of the,	67
Clothing, false doctrine that children are hardened in constitution by light dressing,	183, 190	Drink, abominable habit of giving children stimulating,	218
Clothing, hygienic remarks on,	183	Drink, alcoholic, hygienic remarks on,	178
Clothing, injurious effects of too little,	183	Drink, distention and debility of stomach from taking too large a quantity of,	176
Clothing, injurious effects of too much,	184	Drink, injurious effects of the immoderate use of water by children,	219
Clothing, on buckskin as an article of,	192	Duodenum, anatomy and functions of the,	75
Clothing, on cotton as an article of,	190	Duplicature of organs, remarks on the,	122
Clothing, on India rubber as an article of,	193	Dura mater, definition,	118
Clothing, on linen as an article of,	189	Dwelling-houses, see <i>Residences</i> .	
Clothing, on medicated hare-skins as articles of,	193	Dyspepsia, caused by eating too rapidly,	169
		Dyspepsia, caused by over-eating,	175

	Page.	F.	Page.
Dyspepsia, caused by taking too much fluid,	176		
E		Fainting, mechanism of,	61
Eating rapidly, an American vice, producing dyspepsia,	109	Fascia, definition of,	66
Engorgement, definition and physiological view of,	156	Fat, structure of,	29
Epidemics, atmospheric causes of,	198	Femur, the bone of the thigh, sec <i>Hip Joint</i> .	
Epidemics, caused by changes of temperature and moisture,	199	Fever, causes of, definitions of the proximate, exciting and predisposing,	141
Epidemics, telluric influences as causes of,	199	Fever, intermissions in, physiological explanation of,	140
Exciting cause, physiological definition of,	141	Fever, remissions in, physiological explanation of,	140
Exercise and rest, bad effects of excessive,	211	Fever, symptomatic, physiological explanation of,	138
Exercise, domestic, within doors, always insufficient for health, and often injurious,	206	Fibula, one of the bones of the leg,	52
Exercise, evils of sectarian prejudices against certain,	208	Fingers and thumb, bones of the,	50
Exercise, hygienic remarks on,	206	Flannel, as an article of dress,	192
Exercise, importance of its being agreeable and voluntary,	209	Food, abuse of cakes and doughy articles for children,	218
Exercise, importance of rest after,	208	Food, both vegetable and animal food required by man,	166
Exercise, rubbing furniture, a popular, but highly injurious prescription for girls who are crooked or round shouldered,	207	Food, children require more food than adults,	176
Exercise, importance of surgical advice in regulating,	208	Food, principles which should regulate the change of the diet of children as they advance in age,	215
Exercise, injurious effects of partial,	207	Food, hygienic remarks on,	166
Exercise, mental, of one faculty, a counter-irritant remedy in disease or hyper-action of another faculty,	210	Food, mastification of, rapid eating very injurious,	169
Exercise, muscular, a counter-irritant remedy in mental and bodily disease,	210	Food, milk improper for food after a certain age,	213
Exercise, passive, invaluable in states of extreme debility,	212	Food, mode of rendering milk wholesome for adults,	214
Exercise, to be useful, must be taken in the open air,	207	Food of children, on the proper,	213
Exposure, of the person, dangers of partial,	186	Food, of the quantity required at different ages and sexes, and by those of different habits,	175
Exposure, of the person, dangers of, particularly at certain hours,	194	Food, plain biscuit or bread necessary for children immediately after dressing in the morning,	219
Exposure, of the person, to render children hardy, destroys numbers,	183, 190	Food required much more frequently than at meal times, by growing children,	219
Extremities, bones of the,	47	Food, see <i>Drink</i> .	
		Food, stimulating, extremely improper for children,	218
		Food, required in old age, and in tropical climates after long residence,	176

	Page.		Page.
Food, the quantity required depends on the amount of exercise taken by the individual,	169	tongue,	54
Food, the proper time of weaning a child,	215	Hyper-nutrition, physiological view of,	147
Food, varieties of food are rendered necessary by custom, climate, occupation, age and sex,	167	Hyper-nutrition, treatment of, physiological principles of, proper,	151
G.		I	
		Jejunum. See <i>Intestine Small</i> .	
Ganglion, nervous, definition,	114	Ileum. See <i>Intestine Small</i> .	
Gin, hygienic remarks on,	178	Ilium. See <i>Pelvis</i> .	
Girls, errors of female school discipline,	220	India-rubber, viewed as an article of dress,	193
Girls, etiolated, and rendered sickly by domestic exercises, under the mistaken doctrine that woman's sphere of action should be confined to home,	207	Inflammation, errors in the definition of,	134
Girls, exercise for, should be agreeable and voluntary,	209	Inflammation, general physiological view of,	153
Girls, punishments for, ill effects and cruelty of those which involve exposure to cold, or limitation of diet,	223	Inflammation, healthy, a term which should be discarded,	134
Girls, improper exposures to cold and dampness,	221	Inflammation, of symptomatic fever in,	138
Girls, round-shouldered, bad effects of corsets, braces, and rubbing furniture,	207	Inflammation, physiological definition of,	138
Girls, sad effects on their health and figure from long sessions at school, uncomfortable benches, and the music-stool,	220	Innominate, os. See <i>Pelvis</i> .	
Glands, absorbent, functions of the,	95	Irritation, capillary, physiological view of,	153
Glands, salivary, anatomical position and function of the,	71	Irritation, nervous physiological view of,	159
H		Irritation, physiological view of,	147
Hardening the constitution of children by exposure, a most unwarrantable notion,	183, 190	Irritation, stages in the propagation of,	142
Hare skins, medicated as articles of dress,	193	Instep, bones of the,	53
Head, bony structure of the,	43	Intestine, great,	81
Heart, anatomy and functions of the,	86	Intestine, small,	79
Hip-joint, bony anatomy of the,	51	Ischium. See <i>Pelvis</i> .	
Humerus os humeri, see <i>Bone of the Arm</i> .		K	
Hygiene, remarks on,	166	Kidneys, anatomy of the,	103
Hyoides os, the bone of the		Knee-cap, or knee-pan,	52
		Knee-joint, bony anatomy of the,	51
		L	
		Lacteals, anatomy and functions of the,	93
		Larynx, anatomy and functions of the,	96
		Ligaments, anatomical definition of the,	35
		Linen, as an article of dress,	139
		Liver, function of the,	76
		Lungs, anatomy of the,	98
		Lymphatics. See <i>Lacteals</i> .	

M

	Page.
Matrimony, hygienic principles which should govern it,	226
Matrimony, its influence on the health of the mother and offspring, on hereditary diseases and moral peculiarities,	226
Medical theories, defence of,	131
Metastasis, physiological definition of,	146
Miasm, miasmata, definition, effects of,	199
Milk, becomes unwholesome after the proper time for weaning,	213
Milk, mode of rendering it wholesome for adults,	214
Moisture and air, hygienic remarks on,	197
Muscle-like coat of the arteries, remarks on the,	61
Muscles mixed, description of the,	62
Muscles, notice of the diseases of,	66
Muscles, or muscular system, anatomy of the,	56
Muscles, voluntary and involuntary, description of the,	59
Muscular fibre, construction of the,	57

N

Nerves, anatomy and functions of the,	111
Nerves, colour and consistence of the,	111
Nerves, divided into several systems,	22
Nervous matter, intimate structure of,	111
Nutrition, function of,	92, 126

O

Occipital bone, definition,	47
Os coccygis. See <i>Pelvis</i> .	
Os femoris, the thigh bone. See <i>Hip Joint</i> .	
Os Hyoides. See <i>Bone of the Tongue</i> .	
Os humeri. See <i>Bone of the Arm</i> .	
Os ilium. See <i>Pelvis</i> .	

Os innominatum. See <i>Pelvis</i> .	
Os ischium. See <i>Pelvis</i> .	
Os sacrum. See <i>Pelvis</i> .	
Ossaceous system, anatomy of the,	31

P

Pancreas, anatomy and functions of the,	78
Parietal bones, definition,	46
Passive exercise, remarks on,	212
Patella, anatomical position and action of the,	52
Pelvis, bony anatomy of the,	41
Periosteum, definition,	34
Peritoneum, arrangement of the,	70
Phrenology, anatomical basis of,	120
Physiology, definition,	126
Pia mater, definition,	119
Plexus, nervous, definition,	112
Portal vessels, anatomy and functions of the,	89
Pre-disposing cause, physiological definition of,	141
Proximate cause, physiological definition of,	141
Pubis. See <i>Pelvis</i> .	

R

Radius, one of the bones of the fore-arm,	49
Re-production of parts in the healing of wounds,	133
Residences, defects of domestic architecture as displayed in American,	203
Residences, effects of vegetation in rendering them healthy,	200
Residences, effects of heights and ridges in rendering them unhealthy,	204
Residences, general healthfulness of in a well cleared country,	201
Residences, healthfulness of, in a wild country,	200
Residences, heated roofs a source of disease, creating an artificial hot climate,	203
Residences, importance of an elevated site for,	202
Residences, importance of the choice of soil, the direction of the prevalent winds, the po-	





W	Page.	Wollen, as an article of dress, remarks on,	Page.
Weaning, the principles which should regulate the weaning of children,	215	Wounds, of the re-production of parts after,	133
Whisky, hygienic remarks on,	179	Wounds, union of, physiological history of the,	135
Windpipe. See <i>Trachea</i> , <i>Bronchia</i> , and <i>Larynx</i> ,		Wounds, of symptomatic fever from,	138
		Wrist, bones of the,	50

## INDEX OF PART II.

A	Page.	B	Page.
Abdomen, contusions in the,	275	Bandage, suspensory, for varicocele,	294
Abdomen, incised wounds of the,	250	Bandages, their application in wounds,	244
Abdomen, lacerated wounds of the,	257	Basilicon ointment,	591
Abscesses,	359	Bed-stead, for the bed-ridden,	329
Abscess, of the mamma (puerperal,)	537	Biles,	363
Absorbents, inflammation of the,	426	Bites of serpents. See <i>Poisoned Wounds</i> .	
After-birth, nature of the,	414	Bladder, palsy of the,	537
After-birth, partial separation of the, effects on the mother and child,	414	Bleeding, from the nose,	506
Ague,	388	Bleeding, mode of arresting hemorrhage in wounds,	236
Anasarca. See <i>Cellular Dropsy</i> .		Blister ointment,	583
Aneurismal varix,	299	Blood, spitting of,	439
Aneurism from anastomosis,	300	Body, coming down of the,	287
Aneurisms,	298	Boxing the ears, ill effects of,	263
Angina pectoris,	443	Brain, concussions of the,	264
Ani prolapsus,	287	Brain, compression of the,	267
Anus, dilatation of the,	287	Breast bone, fractures of the, See <i>Contusions of the Chest</i> .	
Aphthous sore mouth in children,	548	Breast. See <i>Inflammation</i> .	
Apoplexy,	484	Brown mixture,	584
Appendix,	583	Burns, remarks on burns producing collapse	346
Arm, dislocation of the arm into the arm pit,	331	Burns, treatment of burns unattended by collapse,	368
Arm, fractures of the,	323		
Arteries, enlargements of the,	298	C	
Asafoetida mixture, or tea,	583	Camphor julap,	584
Ascites,	489	Camphor mixture,	584
Asthma,	441	Cancer,	378
		Cancer of the uterus,	580



	Page.		Page.
Dropsy in the chest,	489	Fractures, bed-stead for,	329
Dropsy of the abdomen,	489	Fractures, general remarks on,	319
Drowning,	511	Fractures of the arm,	323
Dry gangrene,	343	Fractures of the clavicle,	321
Dysentery,	457	Fractures of the elbow joint,	324
Dyspepsia,	497	Fractures of the fibula, with	
		dislocation of the ankle,	332
D		Fractures of the fingers and	
Ear-ache and suppurations in		toes,	328
the ear,	356	Fractures of the fore-arm,	325
Ear, foreign bodies, and insects		Fractures of the leg,	327
in the,	355	Fractures of the lower extremi-	
Ears, boxing the, injurious ef-		ties,	327
fects of,	263	Fractures of the lower jaw,	329
Elbow joint, fractures of the,	324	Fractures of the pelvis,	279
Epilepsy,	481	Fractures of the ribs and ster-	
Erysipelas,	421	num, see <i>Contusions of the</i>	
Erysipelas in infants,	557	<i>Chest.</i>	
Erysipelas phlegmonodes,	425	Fractures of the skull,	268
Excoriations of the mucous ori-		Fractures of the shoulder-blade,	323
fices,	359	Fractures of the spine,	271
Excoriations, see <i>Chafing.</i>		Fractures of the thigh,	326
Eye, film on the,	354	Fresh cuts, absurdity of nos-	
Eye, foreign substances in the,	350	trums for,	247
Eye, inflammation of the,	351	Frost-bite, gangrene from cold,	344
Eye-lashes, ulceration of the,	349	Furuncle,	364
		G	
F		Gall-stones, passage of,	463
Falling of the womb,	577	Gangrene, dry,	343
Femoral hernia, definition,	304	Gangrene from cold,	344
Fever, bilious,	400	Gangrene from excessive in-	
Fever, continued,	393	flammation,	343
Fever, description of,	387	Gangrene from internal or	
Fever, intermittent,	388	constitutional causes,	343
Fever, miliary,	415	Gangrene from mechanical in-	
Fever, petechial, or spotted,	403	juries,	345
Fever, scarlet,	413	Gangrene from pressure,	344
Fever, yellow,	401	Gangrene of old men,	342
Fibula, fractures of the, with		Gangrene, or mortification,	342
dislocation of the ankle,	332	Gangrene, see <i>Malignant Pus-</i>	
Film on the eye,	354	<i>tule, and Carbuncle.</i>	
Fingers, fractures of the,	323	Gangrenous sore mouth of chil-	
Flatulence,	493	dren,	366
Flooding, see <i>Menstruation,</i>		Gilder's tremors, see <i>Shaking</i>	
<i>excessive, and Uterine He-</i>		<i>Palsy.</i>	
<i>morrhage.</i>		Glass-wounds, treatment of,	246
Fluor albus,	576	Gonorrhœa, see <i>Suppuration</i>	
Fœtus, see <i>Child.</i>		<i>of Mucous Passages, and</i>	
Fore-arm, fractures of the,	325	<i>Venereal Disease.</i>	
Foreign bodies in the ear,	355	Gout,	476
Foreign bodies in the eye,	350	Gravel,	509
Formulary,	583	Green fever,	570
Fractures, about the shoulder-		Gum-biles,	357
joint,	323	Gum-rash,	420



## H

	Page.		Page.
Hanging, death by,	512	Inflammation of the absorbents,	426
Head, injuries of the,	263	Inflammation of the eyes,	351
Heart-burn,	492	Inflammation of the eyes, in in-	
Heart-burn in pregnancy,	517	fants,	552
Heart, dilatation of the,	298	Inflammation of the kidney,	466
Hemiplegia,	487	Inflammation of the liver,	464
Hemoptisis,	439	Inflammation of the lungs,	432
Hemorrhage, modes of arrest-		Inflammation of the nipples,	439
ing in wounds,	236	Inflammation of the pleura,	431
Hemorrhage, uterine,	526	Inflammation of the veins,	426
Hemorrhage, pulmonary,	440	Inflammation of the womb,	531
Hemorrhoids or piles,	294	Inflammation, terminations of,	334
Hernia, anatomical view of the		Inflammation, termination in	
parts concerned in,	303	effusion,	337
Hernia, common inguinal, and		Inflammation, termination by	
concealed inguinal, defini-		gangrene,	342
tions,	303	Inflammation, termination by	
Hernia, direct inguinal, and		resolution,	335
ventro-inguinal, definitions,	304	Inflammation, termination in	
Hernia, femoral, umbilical, and		suppuration,	338
ventral, definitions,	304	Inflammation when coupled	
Hernia, operation for strangu-		with collapse,	346
lated,	306	Inflammation, treatment of,	335
Hernia, or rupture,	302	Influenza,	430
Hernia, reducible, irreducible,		Infusion of bone-set,	587
and strangulated, definitions,	302	Infusion of cascarrilla,	588
Hernia, reduction of by taxis,	308	Infusion of chamomile,	588
Hernia, retention of, by trusses,		Infusion of colombo,	588
radical cure,	309	Infusion of flaxseed,	588
Hernia, symptoms, and conse-		Infusion of galls,	589
quences of strangulation in,	304	Infusion of horse-mint,	589
Hernia, taxis in, definition,	302	Infusion of quassia,	589
Hernia, varicocele mistaken		Infusion of senna,	589
for,	293	Inguinal hernia, common and	
Hiccough,	504	concealed, definitions,	303
Hip-joint disease,	371	Inguinal hernia, ventro-ingui-	
Hordeolum,	349	nal and direct varieties of,	304
Hydrocephalus,	490	Injuries producing collapse,	346
Hydrocephalus in children,	562	Joints, contusions and sprains	
Hydrothorax,	489	of the,	281
Hysteria,	482	Joints, incised wounds of the,	252
		Joints, lacerated wounds of the,	258
		Itch,	418

## J

Jaundice,	467
Jaundice in infants,	543
Jaw, lower, fractures of the,	329
Pleuris, or iliac passion,	461
Incised wounds, see <i>Wounds</i> .	
Incontinence of urine, in chil-	
dren,	547
Indigestion,	497
Inflammation, and abscess of	
the mamma,	537
Inflammation, and its conse-	
quences,	335

## K

Kidneys, contusions and rupture	
of the,	276
Kidneys, inflammation of the,	466

## L

Labour, management of,	520
Labour, management of the	
child at birth,	523
Labour, preparations for the ap-	
proach of,	518

	Page.		Page.
Labour, after-treatment of the mother,	525	Neutral mixture,	590
Lacerated wounds,	254	Nipples, inflammation of the,	539
Lacerated wounds of the leg,	257	Nitro-muriatic bath,	591
Lacerated wounds of the abdomen,	257	Nose, bleeding from the,	506
Lacerated wounds of the chest,	257		O
Lacerated wounds of the joints,	258	Ophthalmia, see <i>Inflammation of the Eyes.</i>	
Lacerated wounds of the scalp,	247	Ointment, basilicon,	591
Leg, fractures of the,	327	Ointment, blister,	583
Leg, see <i>Fibula.</i>		Ointment, cicuta,	591
Leg, swelled or milk,	534	Ointment, celandine,	591
Leucorrhœa,	576	Ointment, Kentish,	591
Lichen,	417	Ointment, red precipitate,	592
Lictery,	456	Ointment, savine,	592
Lime water,	590	Ointment, stramonium,	592
List of drugs and apparatus,	596	Ointment, tar,	592
Liver, contusions and ruptures of the,	275	Ointment, white precipitate,	592
Liver complaint,	464	Ointment, white precipitate, with camphor,	593
Liver, inflammation of the,	464		P
Local palsy,	487		
Lung fever,	432		
Lying-in women, after-treatment of,	518	Painful urination, in children,	545
Lying-in women, see <i>Labour.</i>		Palsy,	487
		Palsy of the bladder, puerperal,	537
		Palsy of the bladder, see <i>Continued Fever, Concussions of the Spine, and Fractures of the Pelvis.</i>	
M.		Palsy, local,	487
Malignant pustule,	342	Palsy, shaking,	480
Mammary abscess, puerperal,	537	Paraplegia,	487
Measles,	412	Pelvis, contusions of the,	278
Menses, appearance of the,	572	Pelvis, fractures of the,	279
Menses, final cessation of the,	575	Perineum, contusions of the,	278
Menses, suppression of the,	572	Phlebitis, see <i>Veins.</i>	
Menstruation, excessive,	574	Phlegmasia dolens,	534
Menstruation, obstructed,	573	Poultice, carrot,	594
Menstruation, painful,	573	Poultice, charcoal,	593
Milk abscess,	537	Poultice, cicuta,	593
Milk of asafœtida,	583	Poultice, fermenting,	593
Moles,	375	Poultice, flaxseed,	593
Milk leg,	534	Poultice, yeast,	593
Mortification, see <i>Gangrene.</i>		Phthisis,	435
Mother marks, from fright during pregnancy,	516	Pilis,	294
Mother spots, see <i>Aneurism from Anastomosis.</i>		Placenta, see <i>After-birth.</i>	
Mouth, ulcerations in the,	355	Pleurisy,	431
Mumps,	444	Pneumonia, see <i>Lung Fever.</i>	
Mumps, in children,	565	Poisoned wounds,	422
		Polypus of the uterus,	580
N		Pregnancy,	513
		Pregnancy, abuse of blood-letting in,	515
Nails, growing into the flesh,	362	Pregnancy, unpleasant symptoms during,	515
Navel, sore,	542		
Nettle-rash,	416		

	Page.		Page.
Pressure, gangrene from,	344	Scapula, see <i>Shoulder-Blade</i> .	
Prickly heat,	417	Serofula,	376
Prolapsus ani,	287	Skull, fractures of the,	268
Prolapsus uteri,	579	Scurvy,	384
Proud flesh,	341	Shaking palsy,	480
Pruriginous rash,	420	Shingles,	417
Pruritis vulvæ,	576	Shoulder-blade, fractures of	
Puerperal convulsions,	527	the,	323
Puerperal fever,	532	Shoulder-joint, fractures about	
Puerperal nervousness, mania,		the,	323
and melancholy,	535	Sick-room, proper management	
Puerperal palsy of the bladder,	537	of the,	398
Puerperal swelled throat,	537	Small-pox,	405
Pulmonary, see <i>Lung, Con-</i>		Soft corns,	374
<i>sumption, Hemorrhage</i> .		Solution of pith of sassafras,	594
Punctured wounds,	283	Solution of acetate of ammo-	
Pus, definition,	241	nia. [See <i>Errata</i> .]	595
Pustule, malignant,	342	Sore mouth, see <i>Aphthæ, Can-</i>	
		<i>ker</i> .	
Q		Sore navel,	592
Quinine, mode of prescribing		Spice-plaster,	594
in ague,	392	Spine, concussions of the,	273
Quinine mixture,	392	Spine, contusions in the cavity	
Quinine pills,	392	of the,	271
Quinsy,	444	Spine, contusions of the soft	
Quinsy in children,	566	parts about the,	272
		Spine, curvature of the,	311
R		Spine, fractures and sudden	
Rash, gum,	420	dislocations of the,	271
Rash, nettle,	416	Spirits of Mindererus. [See <i>Er-</i>	
Rash, pruriginous,	420	<i>rata</i> .]	595
Rash, rose,	419	Spirits of camphor,	595
Reptiles, bites of, see <i>Poisoned</i>		Spitting of blood,	439
<i>Wounds</i> ,		Spleen, contusions and ruptures	
Retention of urine in children,	545	of the,	275
Retroversion of the uterus,	579	Splints, their use in wounds,	245
Rheumatism,	473	Sprains of the joints,	281
Ribs, fractures of the, see <i>Con-</i>		Sternum, fractures of the, see	
<i>tusions of the Chest</i> .		<i>Contusions of the Chest</i> .	
Ring-worm,	418	Stomach, blows on the,	279
Run-round,	361	Stone in the bladder, see <i>Gra-</i>	
Rupture of the kidneys,	276	<i>vel</i> .	
Rupture of the liver,	275	Stooping, habit of,	318
Rupture of the spleen,	275	Strangulated hernia,	302
Rupture of the uterus,	525	Strangury,	508
Rupture, see <i>Hernia</i> .		Sty,	349
		Summer complaint, see <i>Chole-</i>	
S		<i>ra Infantum</i> .	
Saint Vitus' dance,	479	Suppuration of the ear,	359
Saline draught,	590	Suppuration of the urinary	
Scab, the healing of a wound		passages,	359
beneath a,	246	Suppuration, see <i>Ulcer, Ab-</i>	
Scalds, treatment of,	368	<i>scess</i> .	
Scalp, wounds of the,	247	Suppuration, termination of in-	
		flammation in,	337
		Suspended animation, see	
		<i>Drowning, Suspension</i> .	

	Page.		Page.
Suspended animation of the child at birth,	524	V.	
Suspension, death from,	512	Vaccination, method of,	411
Suture, or stitching in wounds,	242	Vaccine disease,	410
Swelled breasts of infants,	542	Varicose aneurism,	299
Swelled leg,	534	Varicocele,	293
Swelled throat, puerperal,	537	Varicose ulcers,	292
		Varicose veins,	290
T		Varoloid,	409
Terebinthine mixture,	595	Venereal disease,	380
Thigh, fractures of the,	326	Veins, inflammation of the,	426
Throat, incised wounds of the,	248	Ventral hernia,	304
Thrush, aphthous sore mouth of children,	548	Ventro-inguinal hernia,	304
Toes, fractures of the,	328	Volatile liniment,	596
Tongue-tie,	541	Vomiting,	502
Tourniquet, see <i>Bleeding</i> .		Vomiting in infants,	555
Turpentine mixture,	595		
U		W	
Ulceration of the cornea,	354	Warts,	375
Ulceration of the eyelashes,	349	Water-brash,	493
Ulceration of the mouth,	355	Water in the brain,	490
Ulceration of the mucous orifi- ces,	359	Water in the brain, in chil- dren,	562
Ulceration, treatment of,	338	White looseness,	456
Ulcer, healthy, a misnomer,	338	Whites,	576
Ulcer, indolent,	340	White swelling,	370
Ulcer, irritable,	339	Whitlow,	361
Ulcer, spreading or phagede- nic,	338	Whooping-cough,	563
Ulcer, varicose,	292	Worms,	470
Union by the first intention,	239	Worms, in infants,	561
Union by the second intention,	240	Womb, see <i>Uterus</i> .	
Urinary consumption, see <i>Dia-   betes</i> .		Wounds and contusions,	235
Urination, excessive, see <i>Dia-   betes</i> .		Wounds, fresh, absurdity of nos- trums for,	247
Urination, painful, in children,	545	Wounds, healing of, by scab,	246
Urine, retention and suppression of, in children,	545	Wounds, incised,	236
Urine, incontinence of, in chil- dren,	517	Wounds, incised,—mode in which nature effects the cure of,	236
Urticaria, see <i>Nettle Rash</i> .		Wounds, incised,—of the abdo- men,	250
Uterine hemorrhage,	526	Wounds, incised,—of the chest,	249
Uterus, anteversion of the,	579	Wounds, incised,—of the joints,	252
Uterus, cancer of the,	580	Wounds, incised,—of the neck and throat,	248
Uterus, inflammation of the,	531	Wounds, incised,—of the scalp,	247
Uterus, inversion of the,	530	Wounds, incised,—treatment of,	242
Uterus, polypus of the,	580	Wounds, lacerated,	254
Uterus, prolapsus of the,	577	Wounds, lacerated,—of the ab- domen,	257
Uterus, retroversion of the,	579	Wounds, lacerated,—of the chest,	249
Uterus, rupture of the,	525	Wounds, lacerated,—of the joints,	258



	Page.		Page.
Wounds, lacerated,—of the		Wounds, union by the first in-	
leg, a mode of treating,	257	tention in,	239
Wounds made by glass,	246	Wounds, union by the second	
Wounds, modes of stopping		intention in,	240
bleeding in,	236	Y	
Wounds, poisoned,	422		
Wounds, punctured,	283	Yellow skin in infants,	543.



## ERRATA.

Page 304, line 3, for "internal," read—external.

Page 327, line 21, for "three keg hoops," read—two keg hoops.

Page 595, line 9, for "muriate of ammonia," (*Sal Ammonia*,) read—carbonate of ammonia.





# BOOKS

PUBLISHED BY CAREY, LEA & BLANCHARD,  
AND TO BE HAD OF ALL BOOKSELLERS.

---

## MEDICINE, &c.

DR. ARNOTT.

ELEMENTS OF PHYSICS, OR NATURAL PHILOSOPHY, GENERAL AND MEDICAL, explained independently of TECHNICAL MATHEMATICS, and containing New Disquisitions and Practical Suggestions. By NEILL ARNOTT, M. D. Second American from the fourth London edition, with Additions by ISAAC HAYS, M. D. 2 vols. 8vo.

---

DR. ABERCROMBIE.

PATHOLOGICAL AND PRACTICAL RESEARCHES ON DISEASES OF THE BRAIN AND SPINAL CORD. By JOHN ABERCROMBIE, M. D. 1 vol. 8vo.

---

*By the same Author.*

PATHOLOGICAL AND PRACTICAL RESEARCHES ON DISEASES OF THE STOMACH, THE INTESTINAL CANAL, THE LIVER, AND OTHER VISCERA OF THE ABDOMEN. 1 vol. 8vo.

---

MEDICAL JOURNAL.

AMERICAN JOURNAL OF THE MEDICAL SCIENCES. *Published Quarterly.* And supported by the most distinguished Physicians in the United States, among which are Professors Bigelow, Channing, Chapman, Cox, De Butts, Dewees, Dickson, Dudley, Francis, Gibson, Hare, Henderson, Horner, Hosack, Jackson, Macneven, Mott, Mussey, Physick, Potter, Sewall, Warren, and Worthington; Drs. Daniell, Drake, Emerson, Fearn, Geddings, Griffith, Hale, Hays, Hapward, Ives, Jackson, Moultrie, Ware, and Wright. It is published *punctually* on the first of November, February, May, and August. Each No. contains about 280 large 8vo. pages, and one or more plates—being a greater amount of matter than is furnished by any other Medical Journal in the United States. Price \$5 per annum.

PROFESSOR BECLARD.

ELEMENTS OF GENERAL ANATOMY, or a description of the Organs comprising the Human Body. By P. A. BECLARD, Professor of Anatomy to the Faculty of Medicine at Paris. Translated by J. TOGNO. 1 vol. 8vo.

---

THOS. BELL.

THE ANATOMY, PHYSIOLOGY, AND DISEASES OF THE TEETH. By THOMAS BELL, F. R. S., F. L. S. &c. In 1 vol. 8vo. With Plates.

---

J. R. BERTIN.

A TREATISE ON DISEASES OF THE HEART AND GREAT VESSELS. By J. R. BERTIN. Edited by G. BOUILLAUD. Translated from the French. 1 vol. 8vo.

---

F. G. BOISSEAU.

PHYSIOLOGICAL PYRETOLOGY; or, A TREATISE ON FEVERS, according to the Principles of the New Medical Doctrine. By F. G. BOISSEAU, Doctor in Medicine of the Faculty of Paris, &c. &c. From the fourth French edition. Translated by J. R. KNOX, M. D. 1 vol. 8vo.

---

BROUSSAIS.

HISTORY OF CHRONIC PHLEGMASIE, OR INFLAMMATIONS, founded on Clinical Experience and Pathological Anatomy, exhibiting a View of the different Varieties and Complications of these Diseases, with their various Methods of Treatment. By F. J. V. BROUSSAIS, M. D. Translated from the French of the fourth edition, by ISAAC HAYS, M. D. and R. EGGLESFIELD GRIFFITH, M. D., Members of the Am. Philosophical Society, Acad. of Nat. Sc., &c. &c. 2 vols. 8vo.



*Books published by Carey, Lea & Blanchard.*

*By the same Author.*

PRINCIPLES OF PHYSIOLOGICAL MEDICINE, including Physiology, Pathology, and Therapeutics, in the form of Propositions, and commentaries on those relating to Pathology, by F. J. V. BROUSSAIS, &c.; translated by ISAAC HAYS, M. D. and R. E. GRIFFITH, M. D. 1 vol. 8vo.

DR. W. P. C. BARTON.

A FLORA OF NORTH AMERICA, with 108 coloured Plates. By W. P. C. BARTON, M. D. In 3 vols. 4to.

BRIDGEWATER TREATISES.

*Now complete in seven volumes.*

I. THE ADAPTATION OF EXTERNAL NATURE TO THE MORAL AND INTELLECTUAL CONSTITUTION OF MAN, by the Rev. THOMAS CHALMERS, D. D., Professor of Divinity in the University of Edinburgh.

II. THE ADAPTATION OF EXTERNAL NATURE TO THE PHYSICAL CONDITION OF MAN, by JOHN KIDD, M. D., F. R. S., Regius Professor of Medicine in the University of Oxford.

III. ASTRONOMY AND GENERAL PHYSICS, considered with reference to Natural Theology, by the Rev. WM. WHEWELL, M. A., F. R. S., Fellow of Trinity College, Cambridge.

IV. THE HAND; its mechanism and vital endowments as evincing design, by Sir CHARLES BELL, K. H., F. R. S.

V. CHEMISTRY, METEOROLOGY, AND THE FUNCTION OF DIGESTION, by WM. PROUT, M. D., F. R. S.

VI. THE HISTORY, HABITS AND INSTINCTS OF ANIMALS. By the Rev. WILLIAM KIRBY, M. A., F. R. S. Illustrated by numerous engravings on copper.

VII. ANIMAL AND VEGETABLE PHYSIOLOGY, considered with reference to Natural Theology. By PETER MARK ROGET, M. D. Illustrated with numerous wood cuts.

VIII. GEOLOGY OF MINERALOGY, considered with reference to Natural Theology. By the Rev. WILLIAM BUCKLAND, D. D., Canon of Christ Church and Reader in Geology and Mineralogy in the University of Oxford.

PROFESSOR BUCKLAND.

GEOLOGY AND MINERALOGY, considered with reference to Natural Theology. By the Rev. WM. BUCKLAND, D. D., Canon of Christ Church and Reader in Geology and Mineralogy in the University of Oxford, being the last of the Bridgewater Treatises on the Power, Wisdom, and Goodness of God as manifested in the Creation. In 2 vols. 8vo. with eighty-nine copper-plates and maps.

DR. CHARLES BELL.

THE HAND; ITS MECHANISM, AND VITAL ENDOWMENTS, AS EVINCING DESIGN. By Sir CHARLES BELL. 1 vol. 12mo. Being a part of the Bridgewater Treatises.

J. CHITTY, Esq.

A PRACTICAL TREATISE ON MEDICAL JURISPRUDENCE, with so much of Anatomy, Physiology, Pathology, and the Practice of Medicine and Surgery, as are essential to be known by Members of the Bar and Private Gentlemen; and all the laws relating to Medical Practitioners; with explanatory plates. By J. CHITTY, Esq. First American edition: with Notes and Additions, adapted to American works and Judicial Decisions. 1 vol. 8vo. with plates.

J. G. COSTER, M. D.

THE PRACTICE OF MEDICINE, upon the Principles of the Physiological Doctrine. By J. G. COSTER, M. D. Translated from the French. 1 vol. 8vo.

DR. CAZENAVE.

A PRACTICAL SYNOPSIS OF CUTANEOUS DISEASES, from the most celebrated Authors, and particularly from Documents afforded by the Clinical Lectures of Dr. Biett, Physician to the Hospital of St. Louis, Paris. By A. CAZENAVE, M. D. and H. F. SCHEDEL, M. D. Second edition, 1 vol. 8vo.

JAMES CLARK, M. D., &c.

A TREATISE ON PULMONARY CONSUMPTION, comprehending an Inquiry into the Cause, Nature, Prevention, and

*Books published by Carey, Lea & Blanchard.*

Treatment of Tuberculous and Scrofulous Diseases in general. By JAMES CLARK, M. D., F. R. S., &c. In 1 vol. 8vo.

---

CUVIER.

CUVIER'S ANIMAL KINGDOM, arranged in conformity to its organization. Translated by H. M'MURTRIE, M. D. 4 vols. 8vo. with numerous plates.

---

PROFESSOR COLLES.

TREATISE ON SURGICAL ANATOMY. By ABRAHAM COLLES, Professor of Anatomy and Surgery in the Royal College of Surgeons in Ireland, &c. Second American edition, with notes by J. P. HOPKINSON, Demonstrator of Anatomy in the University of Pennsylvania, &c. &c. 1 vol. 8vo.

---

CHEMISTRY OF THE ARTS.

THE CHEMISTRY OF THE ARTS, on the basis of Gray's Operative Chemist, being an Exhibition of the Arts and Manufactures dependent on Chemical Principles, with numerous Engravings. By ARTHUR L. PORTER, M. D., late Professor of Chemistry, &c. in the University of Vermont. 2 vols. 8vo. with numerous plates.

---

MEDICAL LIBRARY.

THE CYCLOPEDIA OF PRACTICAL MEDICINE AND SURGERY, A DIGEST OF MEDICAL LITERATURE. Edited by ISAAC HAYS, M. D. 2 vols. 8vo. Each article embraced in these volumes is complete within itself, and is of great value as containing information not elsewhere to be obtained.

---

DR. CHALMERS.

ON THE ADAPTATION OF EXTERNAL NATURE TO THE MORAL AND INTELLECTUAL CONSTITUTION OF MAN. By the Rev. THOMAS CHALMERS, D. D.; being a part of the Bridgewater Treatises on the Power, Wisdom, and Goodness of God, as manifested in the Creation. In 1 vol. 12mo.

---

DE LA BECHE.

A GEOLOGICAL MANUAL. By HENRY

T. DE LA BECHE, Esq., F. R. S., F. G. S., Member of the Geological Society of France, &c. In 1 vol. 8vo., with 104 wood cuts.

---

DR. DEWEES.

THE PRACTICE OF PHYSIC. By W. P. DEWEES, M. D., Adjunct Professor of Midwifery, in the University of Pennsylvania, second edition, complete in 1 vol. 8vo.

---

*By the same Author.*

A TREATISE ON THE PHYSICAL AND MEDICAL TREATMENT OF CHILDREN, sixth edition, with corrections. In 1 vol. 8vo.

---

*By the same Author.*

A COMPENDIOUS SYSTEM OF MIDWIFERY; chiefly designed to facilitate the Inquiries of those who may be pursuing this Branch of Study. 1 vol. 8vo. with 13 Plates. Eighth edition, corrected and enlarged.

---

*By the same Author.*

A TREATISE ON THE DISEASES OF FEMALES. Sixth edition, revised and Corrected. 1 vol. 8vo. with numerous plates.

---

ROBLEY DUNGLISON, M. D.

HUMAN PHYSIOLOGY, illustrated by numerous Engravings. By ROBLEY DUNGLISON, M. D., late Professor of Physiology, Pathology, &c., in the University of Virginia, Member of the American Philosophical Society, &c. 2 vols. 8vo. Second edition improved.

---

*By the same Author.*

ON THE INFLUENCE OF ATMOSPHERE AND LOCALITY; change of Air and Climate, Seasons, Food, Clothing, Bathing, Exercise, Sleep, Corporeal and Intellectual Pursuits, &c. on Human Health, constituting Elements of Hygiene. By ROBLEY DUNGLISON, M. D., late Professor of Materia Medica, Therapeutics, Hygiene, and Medical Jurisprudence, in the University of Maryland, &c. 1 vol. 8vo.

*Books published by Carey, Lea & Blanchard.*

*By the same Author.*

GENERAL THERAPEUTICS, OR PRINCIPLES OF MEDICAL PRACTICE, with tables of the Chief remedial agents and their preparations, and of the different poisons and their antidotes. By ROBLEY DUNGLISON, M. D., &c. &c. 1 vol., large 8vo.

*By the same Author.*

THE MEDICAL STUDENT, OR AID TO THE STUDY OF MEDICINE, including a glossary of the terms of the Science, and of the mode of prescribing; Bibliographical Notices of Medical Works; the regulations of the different Medical Colleges of the Union, &c. By ROBLEY DUNGLISON, M. D., Professor of the Institutes of Medicine and Medical Jurisprudence, in Jefferson Medical College, late Professor in the University of Maryland, and University of Virginia, &c. In 1 vol. 8vo.

STUDENT'S GUIDE.

DOMESTIC MEDICINE, OR A TREATISE ON DISEASES, with their remedies. 1 vol. 8vo. (in the press.)

EDWARDS AND VASSEUR.

MANUAL OF MATERIA MEDICA AND PHARMACY. By H. M. EDWARDS, M. D., and P. VASSEUR, M. D., comprising a concise Description of the Articles used in Medicine; their Physical and Chemical Properties; the Botanical Characters of the Medicinal Plants; the Formulæ for the Principal Official Preparations of the American, Parisian, Dublin, &c., Pharmacopœias; with observations on the proper Mode of combining and administering Remedies. Translated from the French, with numerous Additions and Corrections, and adapted to the Practice of Medicine and to the Art of Pharmacy in the United States. By JOSEPH TIGNO, M. D., Member of the Philadelphia Medical Society, and E. DEFRAND, Member of the Philadelphia College of Pharmacy.

JAMES EWELL, M. D.

THE MEDICAL COMPANION, OR FAMILY PHYSICIAN: treating of the Diseases of the United States, with their symptoms, causes, cure, and means of prevention; common cases in Surgery, as fractures,

dislocations, &c.; the management and diseases of women and children; a dispensatory of preparing family medicines, and a Glossary explaining technical terms. To which are added, a brief Anatomy and Physiology of the Human Body, showing, on rational Principles, the cause and cure of diseases. An essay on Hygiene, or the art of preserving health, without the aid of medicine. An American Materia Medica, pointing out the virtue and doses of our medicinal plants. Also, the Nurse's Guide. The eighth edition. By JAMES EWELL, M. D. In one large vol. 8vo.

\* \* This edition has undergone a complete revision, and is brought up to the present time.

DR. ELLIS.

ELLIS' MEDICAL FORMULARY. The Medical Formulary, being a collection of prescriptions derived from the writings and practice of many of the most eminent Physicians in America and Europe. By BENJAMIN ELLIS, M. D. A new Edition, with Additions, (at press.)

M. FARADAY, F. R. S.

CHEMICAL MANIPULATION. Instruction to Students on the Methods of performing Experiments of Demonstration or Research, with accuracy and success. By MICHAEL FARADAY, F. R. S. First American, from the second London edition, with Additions. By J. K. MITCHELL, M. D. 1 vol. 8vo.

S. S. FITCH, M. D.

A TREATISE ON DENTAL SURGERY. Second edition, revised, corrected and improved, with new plates. By S. S. FITCH, M. D. 1 vol. 8vo.

DR. GIBSON.

THE INSTITUTES AND PRACTICE OF SURGERY; being the Outlines of a Course of Lectures. By W. GIBSON, M. D., Professor of Surgery in the University of Pennsylvania. Fifth edition, revised, corrected and enlarged. In 2 vols. 8vo.

DR. GAILL.

A MANUAL OF PIRENOLOGY, being an

*Books published by Carey, Lea & Blanchard.*

analytical summary of the system of Doctor Gall, on the faculties of man and the functions of the Brain, with plates, in 1 vol. 12mo.

—  
E. GEDDINGS, M. D.

—  
A TREATISE ON THE PRACTICE OF MEDICINE, or a Systematic Digest of the Principles of General and Special Pathology and Therapeutics. By E. GEDDINGS, Professor in the University of Maryland. 2 vols. 8vo., (in the press.)

—  
W. E. HORNER, M. D.

—  
A TREATISE ON SPECIAL AND GENERAL ANATOMY. Fourth edition, revised and corrected, in 2 vols. 8vo.

—  
HUTIN.

—  
MANUAL OF THE PHYSIOLOGY OF MAN, or a concise Description of the Phenomena of his Organization. By P. HUTIN. Translated from the French, with Notes, by J. TOGNO. In 12mo.

—  
HENNEN.

—  
PRINCIPLES OF MILITARY SURGERY, comprising Observations on the Arrangements, Police, and Practice of Hospitals, and on the History, Treatment, and Anomalies of Variola and Syphilis; illustrated with cases and dissections. By JOHN HENNEN, M. D., F. R. S. E. Inspector of Military Hospitals—first American from the third London edition, with the Life of the Author, by his son, DR. JOHN HENNEN.

—  
PROFESSOR KIDD.

—  
A TREATISE ON THE ADAPTATION OF EXTERNAL NATURE TO THE PHYSICAL CONDITION OF MAN, principally with reference to the supply of his wants, and the exercise of his intellectual faculties. By JOHN KIDD, M. D., F. R. S., Regius Professor of Medicine in the University of Oxford; being a part of the Bridgewater Treatises on the Power, Wisdom, and Goodness of God, as manifested in the Creation. In 1 vol. 12mo.

—  
PROFESSOR KIRBY.

—  
THE HISTORY, HABITS, AND IN-

—  
STINCTS OF ANIMALS. By the Rev. WILLIAM KIRBY, M. A., F. R. S. In 1 vol. 8vo. Illustrated by numerous engravings on copper; being a part of the Bridgewater Treatises on the Power, Wisdom, and Goodness of God, as manifested in the Creation.

—  
BARON LARREY.

—  
SURGICAL MEMOIRS OF THE CAMPAIGNS OF RUSSIA, GERMANY, AND FRANCE. Translated from the French of BARON LARREY. In 8vo. with plates.

—  
ISAAC LEA.

—  
CONTRIBUTIONS TO GEOLOGY. Illustrated by numerous coloured Engravings. By ISAAC LEA, Member of the American Philosophical Society, &c. &c. In 1 vol. 8vo.

—  
*By the same Author.*

—  
A SYNOPSIS OF THE FAMILY OF NAIADES. By ISAAC LEA, Member of the American Philosophical Society, &c. &c. 1 vol. 8vo. with coloured plates.

—  
PROFESSOR MECKEL.

—  
MANUAL OF GENERAL, DESCRIPTIVE, AND PATHOLOGICAL ANATOMY. By J. F. MECKEL, Professor of Anatomy at Halle, &c. &c. Translated from the French, with Notes, by A. SIDNEY DOANE, A. M., M. D. 3 vols. 8vo.

—  
MARTINET.

—  
MANUAL OF PATHOLOGY: containing the symptoms, Diagnosis, and Morbid Character of Diseases, &c. By L. MARTINET. Translated, with Notes and Additions, by JONES QUAIN. Second American Edition. 12mo.

—  
PHRENOLOGY.

—  
PHRENOLOGY, and the Moral Influence of Phrenology. Arranged for general study, and the purposes of education, from the first published works of Gall and Spurzheim, to the latest discoveries of the present period. By MRS. L. MILES.  
"Man's greatest knowledge is himself to know."  
*Pope.*



*Books published by Carey, Lea & Blanchard.*

PROFESSOR PROUT.

CHEMISTRY, MINERALOGY, AND THE FUNCTIONS OF DIGESTION, considered with reference to Natural Theology. By WM. PROUT, M. D., F. R. S., Fellow of the Royal College of Physicians. Being a part of the Bridgewater Treatises, on the Power, Wisdom, and Goodness of God, as manifested in the Creation. 1 vol. 12mo.

USHER PARSONS, M. D.

DIRECTIONS FOR MAKING ANATOMICAL PREPARATIONS, formed on the basis of Pole, Marjolin, and Breschet, and including the new method of Mr. Swan. By USHER PARSONS, M. D., Professor of Anatomy and Surgery. 1 vol. 8vo., with Plates.

PROFESSOR ROGET.

ANIMAL AND VEGETABLE PHYSIOLOGY, considered with reference to Natural Theology. By PETER MARK ROGET, M. D. Illustrated with nearly 500 wood-cuts. In 2 vols. 8vo.; being a part of the Bridgewater Treatises.

RICHARD REESE, M. D.

LADY'S MEDICAL GUIDE. By RICHARD REESE, M. D. 18mo.

JAMES SNELL.

A PRACTICAL GUIDE TO OPERATIONS ON THE TEETH. By JAMES SNELL, Dentist. In 1 vol. 8vo., with Plates.

SOUTHWOOD SMITH.

A TREATISE ON FEVER. By SOUTHWOOD SMITH, M. D., Physician to the Lon-

don Fever Hospital. A new edition. vol. 8vo.

PROFESSOR SYME.

PRINCIPLES OF SURGERY. By JOHN SYME, Professor of Surgery in the University of Edinburgh. In 1 vol. 8vo.

DR. TWEEDIE.

CLINICAL ILLUSTRATION OF FEVER, comprising a Report of Cases treated at the London Fever Hospital in 1828-29. By ALEXANDER TWEEDIE, M. D., Physician in the Fever Hospital, &c. 1 vol. 8vo.

JOHN THOMPSON, M. D.

LECTURES ON INFLAMMATION, exhibiting a view of the General Doctrines, Pathological and Practical, of Medical Surgery. By JOHN THOMPSON, M. D., F. R. S. E. Second American edition. 1 vol. 8vo.

PROFESSOR WHEWELL.

ASTRONOMY AND GENERAL PHYSICS, considered with reference to Natural Theology. By the Rev. WILLIAM WHEWELL, M. A., Fellow and Tutor of Trinity College, Cambridge; being a part of the Bridgewater Treatises on the Power, Wisdom, and Goodness of God, as manifested in the Creation. In 1 vol. 12mo.

C. J. WILLIAMS, M. D.

A RATIONAL EXPOSITION OF THE PHYSICAL SIGNS OF DISEASES OF THE LUNGS AND PLEURA; illustrating their Pathology and facilitating their Diagnosis. By CHARLES J. WILLIAMS, M. D. In 8vo. with plates.

*Books published by Carey, Lea & Blanchard.*

THE MEDICAL STUDENT.

—  
THE MEDICAL STUDENT, OR AID TO THE STUDY OF MEDICINE, including a Glossary of the terms of the Science, and of the mode of prescribing; Bibliographical Notices of Medical Works; the regulations of the different Medical Colleges of the Union, &c. By ROBLEY DUNGLISON, M. D., Professor of the Institutes of Medicine and Medical Jurisprudence in Jefferson Medical College, late Professor in the University of Maryland, and University of Virginia, &c. In 1 vol. 8vo.

"This is another of those valuable compilations for which the profession in America is so much indebted to Professor Dunglison.

"Although chiefly intended for students in the American States, it will be useful for students in all countries, as it contains a vast deal of that kind of miscellaneous and varied information which is so constantly needed, yet so difficultly found by them. Besides the mere technical matters, this volume touches on many subjects of yet higher importance, and, among others, on the moral duties and professional conduct of the medical practitioner, which are laid down clearly and forcibly, and with a just appreciation of the dignity of the office. The following titles of the five chapters of which the work consists, will give a general but not very exact notion of its contents, as it comprehends many things very interesting to the student, yet hardly suggested by its title: Preliminary education, Medical education prior to attendance on Lectures, Medical education during the period of attendance on Lectures, Medical education after Graduation, a Medical Bibliography for the Student and Young Practitioner.

"We recommend 'The Medical Student' in the strongest terms to his brethren in all countries, and in an especial manner to his compatriots."—*British and Foreign Medical Review*.

—  
GENERAL THERAPEUTICS.

—  
GENERAL THERAPEUTICS, OR PRINCIPLES OF MEDICAL PRACTICE, with tables of the chief remedial agents and their preparations, and of the different poisons and their antidotes. By ROBLEY DUNGLISON, M. D., &c. &c. 1 vol. large 8vo.

"There being at present before the public several American works on Therapeutics, written by physicians and teachers of distinction, it might be deemed unjust in us, and would certainly be invidious, to pronounce any one of them superior to the others. We shall not, therefore, do so. If there be, however, in the English language, any work of the kind more valuable than that we have been examining, its title is unknown to us.

"We hope to be able to give such an account of the work as will strengthen the desire and determination of our readers to seek for a farther acquaintance with it, by a candid perusal of the volume itself. And, in so doing, we offer them an assurance that they will be amply rewarded for their time and labour."—*Pennsylvania Journal*, Vol. IX. No. 3. Dec. 1836.

"Few writers in our profession have been more industrious than Professor Dunglison, and fewer still have sustained themselves equally well in the course of so many practical publications. From the hasty perusal which we have given it, we are inclined to think that it possesses equal if not superior merit to any which have preceded it from the prolific pen of its author.

It shows the learning and research of its author on every page, and as an eclectic production it will bear comparison with similar works in any country. We would advise our readers to purchase and peruse it for themselves."—*Western Journal of the Medical Sciences*, No. XXXVIII. p. 252, for September, 1836.

The work ought not to be thus hastily dismissed. From an attentive examination less cannot in justice be said, than that while we find nothing to excite a single captious feeling, we find every thing to instruct and entertain. Although Dr. Dunglison may be regarded a prolific writer, if he produces always such volumes as this, we shall certainly not think him in danger of overworking his genius. We must leave it with the candid advice to every medical man to be soon in possession of this volume of sound and rich observations in the art, he would advance with pleasure, as well as practice as a duty.—*Boston Medical and Surgical Journal*.

*Books published by Carey, Lea & Blanchard.*

YOUNG'S MATHEMATICAL WORKS.

AN ELEMENTARY TREATISE ON ALGEBRA, Theoretical and Practical; with attempts to simplify some of the more difficult parts of the science, particularly the demonstration of the Binomial Theorem, in its most general form; the Solution of Equations of the higher orders; the Summation of Infinite Series, &c. By J. R. YOUNG. A new edition, corrected and improved.

"A new and ingenious general method of solving Equations has been recently discovered by Messrs. H. Atkinson, Holdred, and Horner, independently of each other. For the best practical view of this new method and its applications, consult the Elementary Treatise on Algebra, by Mr. J. R. Young, a work which deserves our cordial recommendation."—*Dr. Gregory's edition of Hutton's Mathematics*.

"For the summation of Infinite Series the author gives a new and ingenious method, which is very easy and extensive in its application."—*Newcastle Mag.*

ELEMENTS OF THE INTEGRAL CALCULUS; with its Applications to Geometry and to the Summation of Infinite Series, &c. Revised and corrected by MICHAEL O'SHANNESY, A. M. 1 vol. 8vo.

"The volume before us forms the third of an analytical course, which commences with the 'Elements of Analytical Geometry.' More elegant text books do not exist in the English language, and we trust they will speedily be adopted in our Mathematical Seminaries. The existence of such auxiliaries will, of itself, we hope, prove an inducement to the cultivation of Analytical Science; for, to the want of such elementary works, the indifference hitherto manifested in this country on the subject is, we apprehend, chiefly to be ascribed. Mr. Young has brought the science within the reach of every intelligent student, and, in so doing, has contributed to the advancement of mathematical learning in Great Britain."—*Presbyterian Review*, January, 1832.

ELEMENTS OF THE DIFFERENTIAL CALCULUS; comprehending the General Theory of Curve Surfaces, and of Curves of Double Curvature. Revised and corrected by MICHAEL O'SHANNESY, A. M. 1 vol. 8vo.

"The whole Elements of the Differential Calculus, comprehending all that is most valuable in the large works of the most celebrated Analysis, are contained in one volume, beautifully printed on a fine paper, and neatly bound in cloth. It appears to be in every respect well fitted for a Class-Book, and can scarcely fail to be very generally adopted."—*Presbyterian Review*, September, 1831.

ELEMENTS OF GEOMETRY; containing a new and universal Treatise on the Doctrine of Proportions, together with Notes, in which are pointed out and corrected several important errors that have hitherto remained unnoticed in the writings of Geometers. Also, an Examination of the various Theories of Parallel Lines that have been proposed by Legendre, Bertrand, Ivory, Leslie, and others. 1 vol. 8vo.

"His observations on the theory of parallel lines, the labour he has bestowed on the doctrines of proportion, as well as his corrections of many errors of preceding Geometers, and supplying their defects, together with his minute attention to accuracy throughout, may be justly considered as rendering his performance valuable, especially to the learner."—*Philosophical Magazine*.

"We have never seen a work so free from pretension and of such great merit. Various fallacies latent in the reasoning of some celebrated mathematicians, both of ancient and modern date, are pointed out and discussed in a tone of calm moderation, which we regret to say is not always employed in the scientific world."—*Monthly Magazine*.

"This is a work of valuable information, the conception of a most enlightened mind, and executed with a simplicity which cannot but carry the important truth it speaks of, home to the conviction of every understanding."—*Weekly Times*.

THE ELEMENTS OF ANALYTICAL GEOMETRY; comprehending the Doctrine of the Conic Sections, and the General Theory of Curves and Surfaces of the second order, with a variety of local Problems on Lines and Surfaces. Intended for the use of Mathematical Students in Schools and Universities.

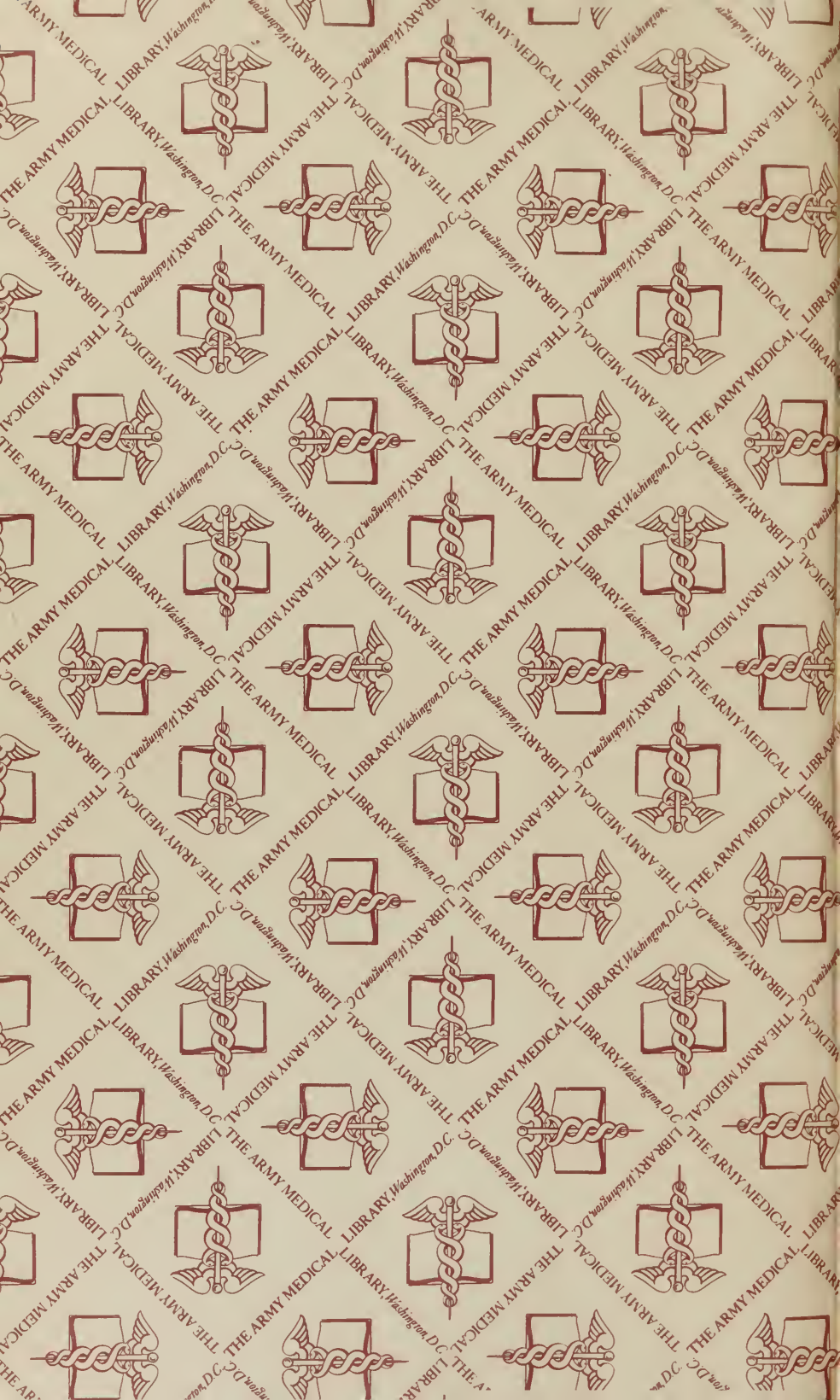
"If works like the present be introduced generally into our schools and colleges, the continent will not long boast of its immense superiority over the country of Newton, in every branch of modern analytical science."—*Atlas*.

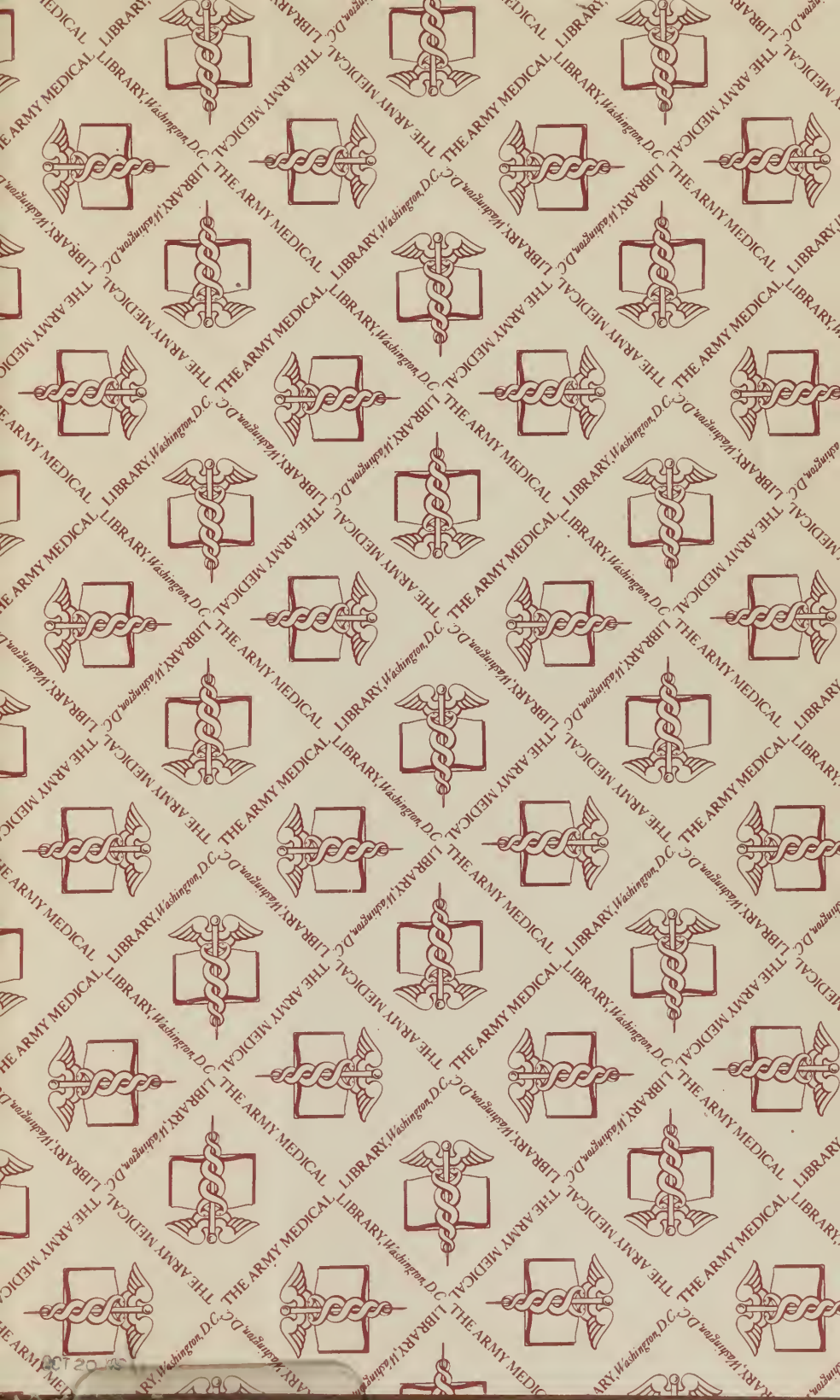
THE ELEMENTS OF MECHANICS; comprehending Statics and Dynamics, with a copious Collection of Mechanical Problems, intended for the use of Mathematical Students, in Schools and Universities; with numerous Plates. Revised and corrected by JOHN D. WILLIAMS. 1 vol. 8vo.

ELEMENTS OF PLANE AND SPHERICAL TRIGONOMETRY; with its applications to the Principles of Navigation and Nautical Astronomy, with the necessary Logarithmic and Trigonometrical Tables. By J. R. YOUNG. To which is added, some Original Researches in Spherical Geometry. By T. S. DAVIES, Esq. Revised and corrected by JOHN D. WILLIAMS. 1 vol. 8vo.









NATIONAL LIBRARY OF MEDICINE



NLM 03274620 0